FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 385. (No. 19, Vol. VIII.)] MAY 11, 1916 [Weekly, Price 1d. Post Free, 1½d.

Flight.

Editorial Office: 44, ST. MARTIN'S LANE, LONDON, W.C.
Telegrams: Truditur, Westrand, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free.
United Kingdom ... 6s. 6d. Abroad ... ... 11s. 0d.

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EDITORIAL COMMENT.

THE names of the Committee appointed to inquire into the administration and command of the Air Service were elicited from the Under-Secretary for War on Monday in the House of Commons, and are given elsewhere in this issue of "FLIGHT." There appear to be two members only—Mr. Charles Bright and Sir Charles A. Parsons—of this Committee who are not of the legal profession. If the inquiry is to be purely a judicial one, there is not perhaps much objection to be raised, but the terms "administration and command" suggest a good deal more than a mere lawyer's inquiry being involved in the work of this Committee. There are many technical questions which must necessarily arise in regard to details, such as can only be adjudicated upon by a practical man well versed in the construction of aircraft. We very seriously doubt whether either of the non-legal members of this body can claim to be included in this category, however eminent they may individually be in their particular spheres of activity. The further leavening down of the *personnel* of the Committee by the addition of a military officer of high rank to serve, as promised by Mr. Tennant, will hardly get over this difficulty. Presumably, however, the Committee will be empowered to call and sift "evidence," and it is to be hoped that, in conjunction with any considered conclusions which may result from the inquiry, this evidence will be also available. All this assumes, of course, that the inquiry relates only to the "murder" and other charges launched by Mr. Pemberton Billing, but even then the necessity for the Committee to understand the relative merits of constructional work and design is very obvious. If the inquiry has been extended, as it would appear from Mr. Tennant's words, then what is wanted is a broad-spirited investigation, having regard to the comparatively undeveloped stage to which the science and art of aerial navigation has at present reached. The findings of this Government body may have a very serious and far-reaching influence upon the future control of aerial matters in this country, and therefore mere dry-as-dust conclusions will leave anything but a clean taste in the mouth. Something beyond this will be looked for, and we very much fear that something will not be forthcoming from a body so constituted as is the present Air Inquiry Committee. If the functions of the select six or seven are merely to give judgment upon facts and occurrences of the past, which have been brought into question by "P.B.," there will probably be little to criticise in the result, subject to expert evidence being taken, although we have certain qualms about the channels which will be open for diluting information which should be properly taken into consideration in arriving at an absolutely impartial conclusion. In the event of the limitations being as suggested, then presumably the report which it is understood Lord Curzon has compiled, will be entirely independent of and outside the scope of this special Committee of inquiry, and it will be possible, therefore, to consider Lord Curzon's views in conjunction with the schemes already put forward respectively by Lord Montagu of Beaulieu and Mr. Pemberton Billing for the re-organisation of the Air Service. In this we shall hope lies the opportunity for some really practicable solution to the situation being evolved. Therefore the sooner a committee to deal with this is brought into being the better.

The Air Service Inquiry Committee.

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Zepps. and their Antidote.

We have had occasion recently to refer to articles by the French Aeronautical writer, Mons. Georges Prade, on the Zeppelin question, and the ways and means of defence against these prowlers of the night. Some of the statements made by Mons. Prade have been open to criticism, and with several of his deductions and suggestions we have not been in agreement; but the fact remains that a goodly number of the suggestions put forward by this exponent of French aviation matters have had in them germs of possibilities which should not be ignored by our authorities on this side. In the *Daily Mail* of May 9th there appeared an article by this

writer on the subject of defence against Zeppelins, in which Mons. Prade points out some of the difficulties of this problem, and draws attention to the material differences, geographically, between the defence of London and Paris. In Mons. Prade's opinion the greatest difficulty is that of signalling the approach of the Zeppelins in time rather than one of dealing effectively with them after they have arrived over our shores. While we are in agreement with the writer when he points out that detection of the approaching airships is far more difficult here than on the French front, since patrol ships, however numerous they may be, are few and far between compared with the observation posts that warn, for instance, Paris of the coming danger, we cannot see quite eye to eye with him when he regards the detection of the Zepps. as the greatest problem, at any rate as long as anti-aircraft guns are the mainstay of our defence. To our way of thinking, the difficulty does not so much lie in detecting the ships as in dealing effectively with them once they have been "spotted." Knowing the problems that enter into the calculations which have made naval gunnery an exact science, and realising how vastly more intricate these become when it comes to dealing with the extra dimension presented by the elevation of an aerial target such as an airship, it does appear to us that one may well wonder that we ever do succeed in scoring a hit except by chance. In this connection we cannot quite share Mons. Prade's contentment and optimism when he states that although in one instance only can it be affirmed with certainty that the airship was struck—in the case of the Zep. which fell in the mouth of the Thames—this is quite sufficient, and that what has been done once can be done again.

Without wishing to detract in the least from the honour due to the gun crew that succeeded in bringing down this particular airship, we think that it would be unwise to conclude that the performance can be repeated at will; in fact, the Germans have since then given opportunity for ample demonstration to the contrary.

Evidently Mons. Prade himself does not, however, consider the guns to be the only, or even the best, form of defence, for he proceeds to outline a scheme by which aeroplanes play an important part in signalling the approach of the airships as well as in combating them. The point raised by Mons. Prade regarding the futility of sending machines up to attack raiders at the moment they are passing overhead is rather hackneyed, since it is perfectly obvious to anyone having the slightest knowledge of the conditions obtaining, as has been pointed out in our columns before now. That some form of aerial patrol should be established (Mons. Prade appears to take it for granted that nothing of the sort is being done) is therefore equally obvious, but it does not, we think, necessarily follow that this should be of the form suggested by Mons. Prade, *i.e.*, aeroplanes cruising about at an altitude of 7,000 to 10,000 ft. and twelve to fifteen miles from the coast. In spite of the writer's contention that an aeroplane could do so safely, since, from that altitude, should its engine stop, an aeroplane could glide down with motor stopped "a distance ten times greater than its height," we are inclined to think that some of our "Blimps" might be more suitable for this purpose. In the first place, we are inclined to doubt whether a seaplane, fitted with floats of considerable weight and carrying sufficient fuel to render it of any service for patrol work during the hours between sunset and sunrise, would have a gliding angle of one in ten—in still air; what if there is an off-shore wind blowing, as does happen occasionally? The gliding angle would then be further reduced. In the second place, small airships would possess the great advantage, that they could stop their engines occasionally and drift, listening the while for the sound of Maybach music which the trained ear could easily tell from that of one of our own smaller engines. We are, however, in agreement with the French writer when he suggests that aerodromes should be established at short intervals along the East coast, each to be provided with a wireless station for communication with the patrolling aircraft, and having accommodation for at least two "chasers," which would be held in readiness to go up as soon as the approach of a Zepp. to their district was signalled. In fact now that, according to the *Weekly Dispatch* of Sunday last, Signor Marconi is said to have overcome the difficulty of receiving wireless messages on board an aeroplane, on account of the noise made by the engine, there seems to be no reason why the patrolling aircraft should not be in constant communication with one another, thus adding considerably to their usefulness.

Mons. Prade appears to share our opinion, expressed in an article appearing elsewhere in this issue, on some suggested arrangements of combined wheel and float under-carriages, and which has, curiously enough, been "in type" for some time, but has, from stress upon our space, been crowded out week after week. He makes the point that machines intended for coast defence should be fitted with a chassis that would enable them to alight safely on either land or sea. With our insular position this is a highly desirable condition to work for.

In addition to the coast patrol, Mons. Prade suggests that "listening posts" should be established in the form of captive balloons anchored to buoys, and capable of rising to 5,000 ft., carrying observers and wireless apparatus. The suggestion *might* be feasible, although there are difficulties in the way, and with anything of a sea running we should imagine that the movements of the buoy would rapidly break the anchor cable or its attachments, which would be distinctly uncomfortable for the occupants, especially if the wind happened to be off shore. We leave the feelings of the occupants to the imagination of our readers.

In conclusion, Mons. Prade points out that the best way to stop raids is to destroy the Zepps. in their lair. This has been again and again a text upon which we have preached, and there are to our knowledge in existence aeroplanes capable of covering the necessary distances to a number of the German airship bases, and, therefore, in this respect, we *can* at once make a move. Finally, we are inclined to agree with Mons. Prade when he writes as follows:—

"Up to now these expeditions have been conceived with the object of bringing back the whole fleet of aeroplanes intact. It is like trying to capture a trench without losing a single soldier. What is needed is many machines attacking *en masse*, descending very low so as to be sure of placing their bombs, and then simply taking their chance like infantrymen.

"This is the only way. To fly at 10,000 ft. and throw little bombs from time to time is like staying in one's trench and hoping to take an enemy trench by rifle shots. The same thing applies to the destruction of the Zeppelin works at Friedrichshafen. The day that a hundred machines arrive at the same time over these works and, planing down regardless of defence guns to within 500 ft. or 600 ft., drop their bombs on the pirates' nest, we may lose many machines, but Germany will lose several Zeppelins."

It is for the commanders to plan, and we have never a doubt that they will find a big surplus of *personnel* to deliver the goods.

The British Air Services

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, *it is not repeated in this column.*

Royal Naval Air Service.

THE following appeared among the Admiralty announcements of the 4th inst. :—

E. C. Horsley granted a temporary commission as Lieutenant (R.N.V.R.), with seniority of May 3rd, and appointed to "President," additional, for R.N.A.S.

The following appeared among the Admiralty announcements of the 5th inst. :—

Lieut.-Commander J. W. L. Hunt granted the acting rank of Commander, with seniority of May 1st.

The following appeared among the Admiralty announcements of the 6th inst. :—

Flight-Commander.—C. H. K. Edmonds, D.S.O., to "President," additional, for Special Service in R.N.A.S., May 5th.

The following appeared among the Admiralty announcements of the 8th inst. :—

Flight Sub-Lieuts. M. A. Simpson and R. Y. Bush (temporary), promoted to Flight-Lieutenant, and Flight-Lieutenant (temporary), respectively, with seniority of April 1st.

The undermentioned have been entered as Probationary Flight Sub-Lieutenants for temporary service, with seniority as follows, and all appointed to "President," additional, for R.N.A.S. : D. D. Findlay, March 28th; G. B. Anderson, March 29th; F. P. L. Washington, April 7th; A. G. Macdonald, April 11th; and W. E. Flett, April 13th.

Mr. E. P. Smyth, granted temporary commission as Lieutenant (R.N.V.R.), with seniority of May 5th, and appointed to "President," additional, for R.N.A.S.

F. Hodges, granted temporary commission as Lieutenant (R.N.V.R.), with seniority of May 6th.

Royal Flying Corps (Military Wing).

The following appeared in a supplement to the *London Gazette* issued on the 2nd inst. :—

Wing-Adjutant.—Capt. Howard N. Walker, Welsh Regt. and to be seconded. Mar. 4th, 1916.

Memoranda.—Sgt. John Arthur Pritchard, from Westmorland and Cumberland Yeo. (T.F.), to be Temporary Second Lieutenant for duty with the R.F.C. Mar. 14th, 1916.

Supplementary to Regular Corps.—Second Lieutenants (on probation) confirmed in their rank : E. J. Watkins and C. J. Creery.

THE following appeared in the *London Gazette* of the 3rd inst. :—

Flying Officer.—Temporary Second Lieut. J. D. Seal, General List. Mar. 29th, 1916.

The following appeared in a supplement to the *London Gazette* issued on the 4th inst. :—

Flight-Commanders.—From Flying Officers and to be Temporary Captains whilst so employed; April 15th, 1916: Second Lieut. C. E. H. Medhurst, R. Innis. Fus.; Second Lieut. J. A. Soames, R. W. Fus. Temporary Lieut. H. B. R. Rowell, R.E. (T.F.), April 16th, 1916.

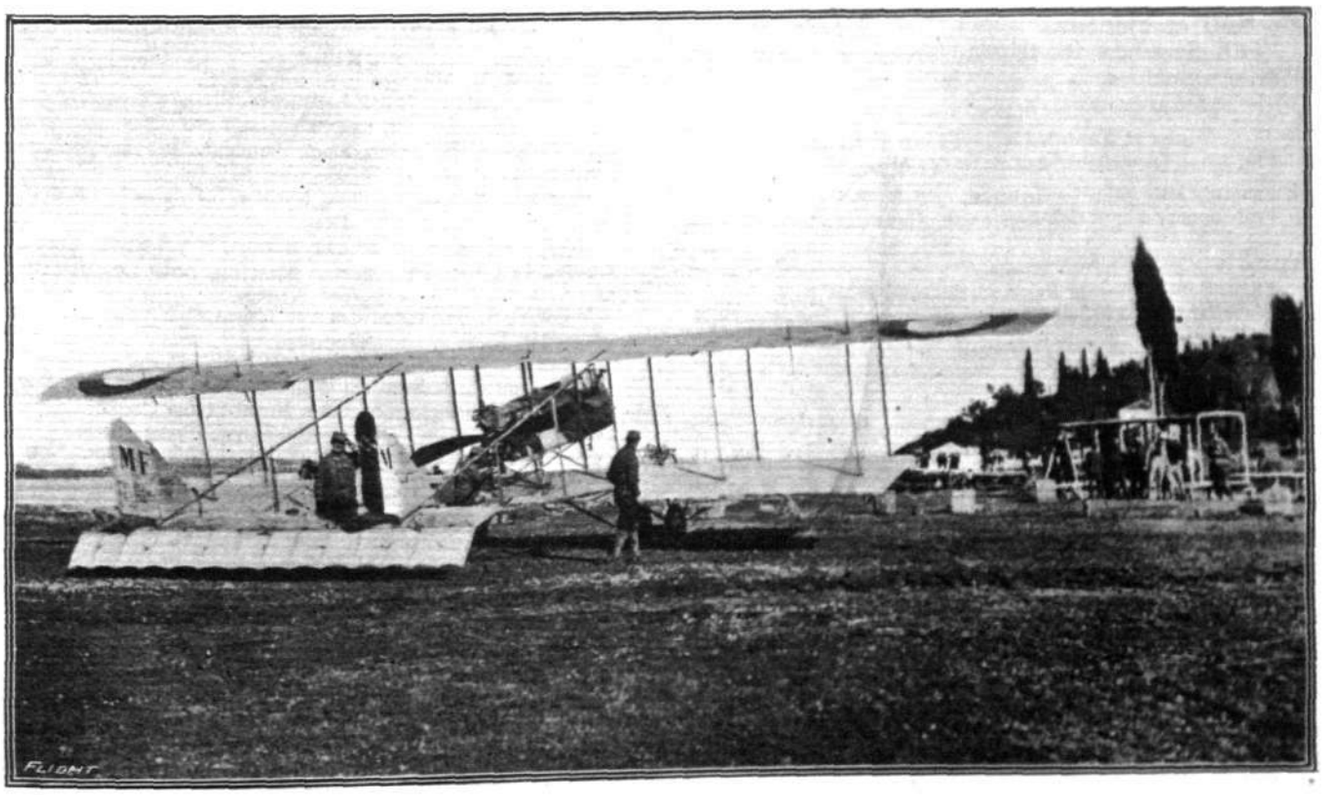
Balloon Officer.—Lieut. G. F. H. Faithfull, 126th Baluchistan Inf., Indian Army, from Temporary Captain, R. Scots; April 3rd, 1916.

Assistant Equipment Officer.—Temporary Second Lieutenant W. C. Nichol, General List; April 17th, 1916.

The Christian name of Jr.-Mr and Hon. Lieut. (Temporary Capt.) Albert Levick is as now described, and not as in the *Gazettes* of March 22nd, 1915, and Feb. 16, 1916.

Memorandum.—Corpl. Robin T. Barlow, from Canterbury Inf., New Zealand Forces, to be Temporary Second Lieut. for duty with the R.F.C.; April 22nd, 1916.

Supplementary to Regular Corps.—To be Second Lieutenants (on probation), April 22nd, 1916: Herman V. Rabagliati, Thorold Perkins, Reginald H. Edwards, George D. Harrison, William S. Shirtcliffe, David C. Bauer, Gwynne Lea, Reginald H. Lownds,



With the re-equipped Serbian Army at Corfu, showing the Serbian Aviation Park and preparing a machine for flight. It is due to the healthy climate of Corfu, the good food and rest in the island, that the Serbian Army has, after its terrible experiences, been brought back into such a splendid condition of health, and has been able to be re-equipped ready to take the field once again.

Stephen G. Howard, Allen P. Adams, Edmund D. Spicer, and Phil p Thompson.

The following appeared in a supplement to the *London Gazette* issued on the 6th inst. :—

Flight-Commanders, and to be Temporary Captains whilst so employed.—Lieut. C. R. Rowden, Worc. R., from a Flying Officer; April 17th, 1916. Temporary Lieut. W. R. Nelson, General List, from a Balloon Officer; April 18th, 1916. *From Flying Officers, and to be Temporary Captains whilst so employed.*—April 18th, 1916: Temporary Lieut. A. W. H. James, 3rd Hrs.; Temporary Lieut. G. H. Norman, General List; Lieut. E. P. Plinty, Manch. R.; Second Lieut. R. F. S. Morton, Special Reserve.

Equipment Officers, and to be Temporary Captains whilst so employed.—Qr.-Mr. and Hon. Lieut. J. Mead, from an Assistant Equipment Officer; April 15th, 1916. Temporary Lieut. S. J. Radford, A. Ord. Dept., and to be transferred to the General List; April 22nd, 1916.

Flying Officers.—April 12th, 1916: Second Lieut. J. O. Archer, R.F.A., Special Reserve; Lieut. N. H. Bottomley, E. York. R., Special Reserve, and to be seconded.

Flying Officer (Observer).—Lieut. J. R Dennistoun, Can. Local Forces, from Can. Cav. Depôt; April 16th, 1916.

Balloon Officers.—April 1st, 1916: Lieut. D. C. L. Speed, K.R. Rif. C., and to be seconded; Temporary Lieut. O. Hook, Gord. Highrs., and to be transferred to the General List; Second Lieut. P. S. Kershaw, Special Reserve. April 3rd, 1916: Second Lieut. G. C. Levick, K.R. Rif. C., and to be seconded. Temporary Second Lieut. G. W. Lynn, 22nd Middlx. R., and to be transferred to the General List; April 12th, 1916. Capt. J. P. Shelley, R. Lanc. R., and to be seconded; Temporary Second Lieut. G. S. D. M. Pape, Gord. Highrs., and to be transferred to the General List. Temporary Second Lieut. G. K. Simpson, General List. Second Lieut. H. P. L. Higman, R.E. (T.F.). Temporary Second Lieut. T. Kennie, E. York R., and to be transferred to the General List. April 18th, 1916; Second Lieut. R. G. Cookson, Special Reserve. Second Lieut. P. B. Moxon, Special Reserve.

Assistant Equipment Officers.—Temporary Second Lieut. D. P. Geddes, General List; April 7th, 1916. Second Lieut. (on prob.) J. M. Furnival, Special Reserve; April 20th, 1916. Lieut. D. C. James, Worc. R., Special Reserve, and to be seconded; April 27th, 1916.

Supplementary to Regular Corps.—Second Lieut. (on prob.) W. O'Hara relinquishes his commission; April 17th, 1916.

The following appeared in a supplement to the *London Gazette* issued on the 8th inst. :—

Flying Officers (Observers).—Lieut. G. C. de Bombasle, R. Canadian R.; Feb. 15th, 1916. Second Lieut. R. R. Money, E. Yorkshire R., and to be seconded; Feb. 27th, 1916.

Assistant Equipment Officers.—Lieut. C. H. Awcock, R.A., from a Flying Officer; March 1st, 1916. Temporary Second Lieut. J. L. Miles, General List; April 23rd, 1916. Second Lieut. W. R. Lewis, Special Reserve; April 25th, 1916.

Supplementary to Regular Corps.—To be Second Lieutenants (on probation): Charles Jarrott; April 18th, 1916. Frederick W. Roberts; April 22nd, 1916.

Central Flying School.

The following appeared in a supplement to the *London Gazette* issued on the 4th inst :—

Assistant Commandant (graded as Wing-Commander).—Lieut. (temporary Major) E. L. Conran, 21st Lrs., a Squadron-Commander vice Capt. (temporary Lieut.-Col.) C. G. Hoare, 39th Horse, Ind. Army; April 2nd, 1916.

The following appeared in the *London Gazette* of the 5th inst. :—

Attached to Headquarter Units.

Brigade Major.—Capt. G. Livingstone, 3rd London Regt. (T.F.), from a Wing-Adjutant, R.F.C., vice Capt. B. C. Fellows, retired pay, Indian Army. April 18th, 1916.

Supplementary to Regular Corps.—Second Lieut. (on probation) R. G. Cookson is confirmed in his rank. To be Second Lieutenants: Paul B. Moxon; Mar. 4th, 1916. Philip S. Kershaw; Mar. 18th, 1916. To be Second Lieutenants (on probation): Harry S. Pell; Mar. 25th, 1916. William S. Roberts; April 18th, 1916. Capt. Henry S. Lees-Smith, Defence Forces of the Union of South Africa, George V. Aimer, James D. Hewett, William F. Williamson, and James C. Burney-Cumming; April 22nd, 1916.

THE following appeared in a supplement to the *London Gazette* issued on the 8th inst. :—

Major N. D. K. MacEwen, Arg. and Suth'd. Highrs., from a Wing Adjutant to be Adjutant; April 1st, 1916.

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The Roll of Honour.

THE Secretary of the Admiralty announces the following casualties :—

Under date April 26th :

Slightly Wounded and Taken Prisoner.

Flight Sub-Lieutenant Cecil B. Gasson, R.N.

Under date May 3rd : **Injured.**

Probationary Flight Sub-Lieutenant Alexander McN. Proctor, R.N.

Under date May 4th : **Missing.**

Flight Sub-Lieutenant Reginald E. Greensmith, R.N.
Probationary Flight Sub-Lieutenant Kenneth M. van Allen, R.N.

Under date May 4th : **Drowned.**

Flight-Lieutenant Oswald N. Walmesley, R.N.

Under date May 5th :

Flight Sub-Lieutenant Herbert R. Simms, R.N.
Sub-Lieutenant Cyril J. A. Mullens, R.N.V.R.

Under date May 5th : **Slightly Injured.**

Probationary Flight Sub-Lieutenant Augustine F. Marlowe, R.N.

Previously reported Missing, now reported Not Missing.

Flight Sub-Lieutenant Reginald E. Greensmith.

Under date May 6th :

Missing, unofficially reported Prisoners of War

Flight Sub-Lieutenant Arthur T. N. Cowley, R.N.
Sub-Lieutenant Ronald M. Inge, R.N.V.R.

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New German Air Base at Brussels.

A REPORT received by the *Telegraaf* from the Dutch frontier says that the Germans are completing a new station for airships and aeroplanes in the immediate neighbourhood of Brussels.

German Prince Killed.

ACCORDING to the *Frankfurter Zeitung* the eldest son of Prince Ernst von Saxe-Meiningen—Baron Georg von Saalfeld—was killed in an air fight at La Bassée by a British aviator.

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The War Office have notified the following casualties :

Killed.

Captain E. H. Mitchell, R.A. and R.F.C.
Second Lieutenant J. Mitchell, Royal Flying Corps.

Died of Wounds.

Lieutenant A. P. Dickie, Black Watch and R.F.C.
Second Lieutenant H. M. E. Adie, R.F.C.
Second Lieutenant J. Milner, Durham L.I., attached R.F.C.

Died.

2nd Class Air-Mechanic F. H. Briscoe, Royal Flying Corps.

Previously Officially reported Missing, now Unofficially reported Killed.

Major V. A. Barrington-Kennett, Royal Flying Corps.

Wounded.

Lieutenant S. H. B. Harris, Royal Flying Corps.
Lieutenant C. R. Rowden, Worcester Regt., attached R.F.C.
Second Lieutenant G. S. Bush, Royal Flying Corps.
Second Lieutenant C. E. Foggin, Royal Flying Corps.
Second Lieutenant N. B. Harris, Royal Flying Corps.
Second Lieutenant C. Monckton, R. Irish Fus. and R.F.C.
Second Lieutenant R. K. Shires, Royal Flying Corps.
Second Lieutenant P. R. Tankerville-Chamberlayne, Hussars and R.F.C.
Second Lieutenant W. H. Tolhurst, Royal Flying Corps.
Second Lieutenant H. C. Vickery, W. Yorks Regt., attached R.F.C.

Previously Officially reported Missing, now Unofficially reported Prisoner of War.

470 Corporal N. V. Piper, Royal Flying Corps.

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Increased Reward for Zep.-Strafers.

MR. JOSEPH COWEN, of Stella Hall, near Newcastle, has increased his offer to the first aviator who brings down a Zeppelin in British territorial waters or on English territory to £2,000.

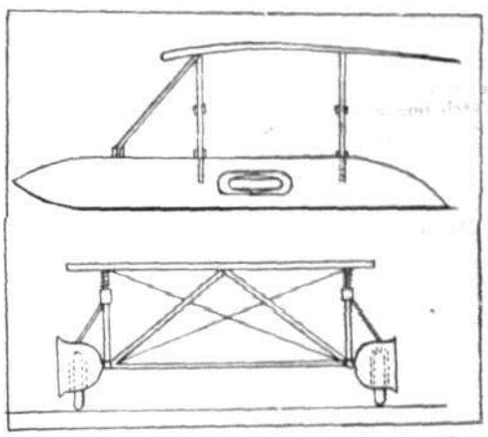
The German Aerial League.

AT the annual meeting in Berlin of the German Aerial Navy League it was announced that the membership had increased in the past 12 months from 9,000 to 36,000.

FLIGHT

A COMBINED WHEEL AND FLOAT UNDER-CARRIAGE.

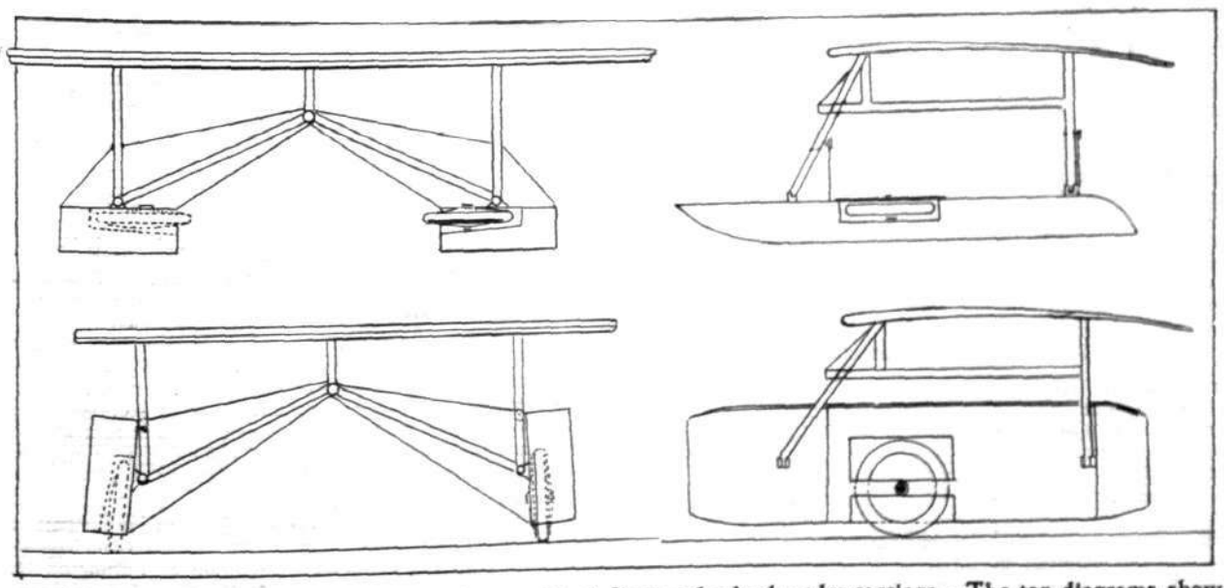
With comparatively few exceptions, notable among which are the Caudron seaplanes, aeroplanes are as a rule divided into two classes—those intended for use over land and those designed to start from and alight on the surface of the sea. The form of under-carriage is consequently determined beforehand, according to the element from which the machine is intended to ascend. In Germany a good deal of experimenting was carried out before the war with the object of producing an under-carriage that would render an aeroplane amphibious, as it were, *i.e.*, enable it to start from and return to either land or sea. Various devices were tried, some fairly successful, others less so. The majority of them had this in common, however much they differed in detail, that the change from land to sea chassis was accomplished from the pilot's seat, thus enabling a machine to start from the land, alight on the sea, and subsequently return to the land again. As a matter of fact, this performance was, if we remember rightly, one of the conditions in the German race for the Lake Constance Prize in 1913. In this country, as has been pointed out, little has been done in this direction. A Sopwith bat boat did, it is true, win the Mortimer Singer Prize, the conditions of which necessitated a combined wheel and float chassis, but apart from this little practical effort at solving the problem has been made here. That the combined land aud water chassis would have its advantages appears obvious, especially under war conditions when a raiding machine, for example, might be forced on account of engine trouble or through other causes to come down before regaining the sea. If this has to be accomplished without wheels there is every probability of disaster, and certainly no hope of re-starting, while, if wheels had been incorporated in the design of the under-carriage, not only would a smash be avoided, but there would be at least a sporting chance of getting the engine going again and making a fresh start. There is one particular sphere where, it appears to us, the combined wheel and float chassis would be of service, *i.e.*, for coast defence. Whatever uses the double service under-carriage is put to, and of whichever form it is, it is evident that it will in principle be a seaplane chassis fitted with auxiliary wheels rather than a land chassis provided with floats, since the machine must initially be designed as a seaplane in order to be capable of lifting the floats. The weight of the extra wheels, with the gear for operating them, should not be prohibitive, whereas the extra weight of a pair of floats on a machine designed for operating over land might, of course, very seriously impair its performance. Bearing this difference in mind, there should be no serious difficulty, from a constructional point of view, in producing an effective combination wheel and float chassis. Several devices were, as we have already pointed out, in existence in Germany as long ago as 1913, some of which were described in our issue of July 26th, 1913. A further contribution to the number of attempts to solve



A suggested alternative mounting by Lieut. Ångström, in which the wheels are sprung by means of a coil spring.

the problem has just been received from Lieut. Ångström, of Stockholm, Sweden, who is a pilot in the Swedish flying corps, and therefore a practical man who knows what is required, from the pilot's point of view.

Lieut. Ångström's proposed combination chassis consists, as will be seen from our illustrations, of two floats mounted on struts in the usual way, but so pivoted around the lower ends of the struts as to enable them to tilt laterally in the manner shown.



Lieut. Ångström's suggested arrangement of a combined float and wheel under-carriage.—The top diagrams show the chassis, in front and side elevation, in position for alighting on water, while the front and side elevations at the bottom illustrate the floats tilted for alighting on land.

Fitting into a recess in the top of the floats and sufficiently to one side to allow a suitable portion to project beyond the sides of the floats—the size of the recess being, of course, determined by the ratio of float width to wheel diameter—are the wheels, which have their axles vertical when the floats are in position for alighting on the sea. The bracing cables holding the floats in position pass over pulleys and hence to suitable levers or wheels in the pilot's cockpit. An alternative arrangement is shown in the last two diagrams, which illustrate a different type of float. There the wheels, instead of being near the top of the floats, are mounted half-way up the side of the floats. The latter pivot sideways against the compression of a coil spring resting on a collar to which is linked the diagonal bracing member that runs down to the side of the float. In this way springing is provided for alighting on land. Lieut. Ångström suggests a further development which consists in having the floats pivoted so that they could rock laterally in both directions, and to have one side of the floats fitted with wheels for alighting on land, and to have runners or skis mounted on the other side for landing on snow or ice. Although being purely diagrammatic, and therefore not showing constructional details of the arrangement, Lieut. Ångström's suggested scheme would seem to have possibilities, and is, we think, worthy of consideration. If anyone wishes to communicate with him his address is: Vanadisvägen 31, Stockholm, Sweden.

THE "X" AIRCRAFT RAIDS.

IN view of the decision of the Government not to allow details of places visited by enemy aircraft to be published, we are, as before, giving to each one an index number. Eventually, when details are available, we shall give the respective information under these index numbers, which will facilitate easy reference to each particular raid.

The following announcements have been officially issued, the date after the index number indicating when the raid occurred :—

"X 34" Raid, May 2nd.

"*War Office, May 3rd, 12.20 a.m.*

"Five hostile airships attacked the north-east coast of England and south-east coast of Scotland last night. The movements of the raiders appear uncertain. A few bombs were dropped in Yorkshire, but no details are yet to hand as to casualties and damage caused thereby."

"*War Office, May 3rd, 5.50 p.m.*

"The Zeppelin raid of last night covered a considerable extent of our eastern coasts. At least five or six airships actually crossed the shore, but reports received from reliable observers made at various times during the night at many points—some so far distant as Rattray Head, in Scotland, down to the north coast of Norfolk—would point to a possibility of a greater number of airships having been employed off our coasts. The enemy, however, made only two attempts to penetrate inland. About 100 bombs were dropped, scattered over many localities. Their exact number is difficult to give, since a great number fell in uninhabited areas, and some others into the sea. Only in a single locality did the raiders cause any casualties or effect much damage. In this case the bombs which fell amounted to twelve explosive and four incendiary, with the result that eighteen houses were damaged.

"The casualties totalled :—

"6 men (including 1 soldier) and 3 women killed ;

"19 men (including 3 soldiers) and 8 women injured.

"Total, 36 casualties.

"The remaining seventy odd bombs occasioned only two casualties (1 soldier and 1 child slightly injured). The damage affected one storehouse and a few cottages, mostly broken glass.

"The raiders only twice came within the range of any anti-aircraft artillery, and on both occasions retreated out of range without delay."

German Version.

"*Berlin, May 4th.*

"The Admiralty Staff announces that a naval airship squadron on Tuesday night attacked the central districts and northern portion of the English East Coast, and dropped numerous bombs, with apparent good results, on factories, smelting furnaces, and railway premises near Middlesbrough and Stockton, industrial works near Sunderland, the fortified coast place of Hartlepool, the coast batteries south of the River Tees, and the British warships at the entrance to the Firth of Forth.

"In spite of a heavy bombardment, all the airships returned to their home ports, with the exception of L. 20, which, owing to a strong southerly wind, was driven off to the north and came to grief near Stavanger. The airship was lost, but the entire crew were rescued."

"X 35" Raid, May 3rd.

"*War Office, May 3rd, 5.10 p.m.*

"A hostile aeroplane visited Deal at 3.59 p.m. this afternoon, coming from the direction of Ramsgate, and dropped six bombs on the railway station. Several houses were badly damaged. One man was badly injured. This is at present the only casualty known. The aeroplane made off, flying above the clouds. Our aircraft went up in pursuit."

"*War Office, May 3rd, 7.30 p.m.*

"Further reports of to day's seaplane attack on Deal give the casualties as two men and one woman injured. There has been no death. The windows of a church were broken, the roof of a house blown off, and a public-house seriously damaged. Windows were broken in about 20 houses. Seven bombs in all were thrown."

German Version.

"*Berlin, May 4th.*

"On Wednesday afternoon one of our naval aeroplanes attacked an English coast battery near Sandwich, south of the mouth of the Thames, and the aerodrome west of Deal with success."

The Press Bureau states that the exaggerations and misstatements in the above report are of the usual kind.

"Mentioned in Despatches."

AMONG a number of names, published in a special supplement to the *London Gazette* on May 5th, which through various causes could not be included at the time, and are now added to the list of officers and men mentioned in General Sir Ian Hamilton's despatch of December 11th, 1915, published at the end of January, appears the following :—

Royal Naval Air Service.—Major R. E. T. Hogg, C.I.E., 38th King George's Own Central India Horse (attached).

An Air Debate in the House of Lords.

NOTICE has been given by Lord Montagu that on the 18th inst. he will open a debate on air policy in the House of Lords by moving the following resolution :—

"That this House considers that the development of aviation for purposes of war can no longer be efficiently carried on under the present system of the divided control and responsibility of two separate departments ; and that the time has now arrived when the supply of men and materials should be concentrated under single control, at the same time leaving the executive power over naval and military aircraft with the Army and Navy as at present."

A Useful Book.

MANY of the "free gifts" in the form of literature are, generally speaking, of about the value paid for them. A very marked example to the contrary, however, is just to hand from the Daimler Co. in the form of a volume of close on three hundred pages, which has been specially prepared by Mr. A. E. Berriman, the chief engineer of the company, for the benefit of members of both flying services. There are chapters written in a lucid and non-technical manner on the petrol engine, the magneto, and the carburettor, together with notes and data on the laws of motion, pressure and resistance constants ; resistance of flat plates, perforated plates, plates in tandem, honeycomb radiators, wires, struts, fair shapes ; frictional resistance, pressure on wing sections, centre of pressure, while there are numbers of useful tables of equivalents, &c. As we have indicated, it is well worth sending for ; application should be made to the Daimler Co. at Coventry.

Aviation at the Royal Academy.

TIME was when aviation was a subject outside the pale of the Royal Academy Exhibition. The last two or three years have seen a change, however, and the present exhibition at Burlington House includes several fine pictures of work in the air. Among these may be noted "Hooge Salient" and "Spotting for the Fleet, Dardanelles" in both of which Mr. Wyllie, in his inimitable style, is very successful, while Mr. Crosby has a striking picture of Lieut. Warneford's historic fight with the Zeppelin.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING.

A SPECIAL MEETING of The Committee was held on Tuesday, the 18th April, 1916, when there were present:—Prof. A. K. Huntington, in the Chair, Lieut.-Col. R. K. Bagnall-Wild, R.E., Lieut.-Col. W. D. Beatty, R.E., Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Col. Sir Capel Holden, K.C.B., F.R.S., Commander C. R. Samson, R.N., D.S.O., Mr. T. O. M. Sopwith, and the Assistant Secretary.

Election of Members.—The following New Members were elected:—

Alfred Edward Barrs.
Second Lieut. Percy Leonard Lindup, R.F.C.
Second Lieut. Charles Eric Robertson, R.F.C.
Second Lieut. John Sowrey, R.F.C.

Daily Mail **£10,000 Prize (Cross Atlantic Flight).**—In response to an enquiry from the Aero Club of America, it was decided that the Competition for the *Daily Mail* £10,000 Prize (Cross Atlantic Flight) could not be held during the war.

Extension of the Club Premises.—A detailed scheme and estimates for the extension of the Club premises so as to provide, amongst other facilities, a room where Members could obtain lunch and dinner, were considered.

It was unanimously decided to extend the premises.

SPECIAL COMMITTEE MEETING.

A Special Meeting of The Committee was held on Tuesday, the 9th inst., when there were present: Prof. A. K. Huntington, in the Chair, Lieut.-Col. W. D. Beatty, R.E., Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Col. Sir Capel Holden, K.C.B., F.R.S., Flight Commander C. F. Pollock, R.N., Mr. T. O. M. Sopwith, and the Assistant Secretary.

Election of Members.—The following New Members were elected:—

Second Lieut. Gervase Babington (North Somerset Yeomanry).
Flight Sub-Lieut. William Knox Denham, R.N.
Second Lieut. Robert Charles Lyon Holme, R.F.C.
Reginald Frank Mann.
Second Lieut. Charles Francis Piercy, R.F.A. (attached R.F.C.).
Second Lieut. Philip Edward Samson (Lancashire Hussars).
Lieut. Maurice Wotton Thomas, R.F.A. (attached R.F.C.).

Temporary Honorary Member.—Mr. Edgar Hercules Reynolds was elected an Honorary Member of the Club for three months, viz., to August 9th, 1916.

Extension of Club Premises.—The question of extending the Club premises was further considered, and it was hoped to complete the necessary arrangements shortly.

THE FLYING SERVICES FUND
administered by
THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 166, Piccadilly, London, W.

Subscriptions.	£	s.	d.
Total subscriptions received to May 2nd, 1916...	10,633	16	8
Collected at the Westland Aircraft Works, Yeovil (Thirtieth contribution)	0	7	2
Collected at the Trocadero Restaurant	1	18	0
Collected from Officers of the Royal Naval Air Station, Redcar	10	10	0
Collected at the Westland Aircraft Works, Yeovil (Thirty-first contribution)	0	8	6
Total, May 10th, 1916	10,647	0	4

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

FROM THE BRITISH FLYING GROUNDS.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Straights with instructor last week: Messrs. De Beer, Bathurst, Burrell, Cooper, Forster, Goodhart, Turner, Matthews, Parkinson, Rabourdin, Sloden, Smith, Spencer, Hillaby and Hodgkinson. Eights with instructor: Messrs. Eichelbrenner, Williams F., and Box.

Instructors: Messrs. Biard, Hale, Manton, Pashley, Russell and Winter.

Brevets during week: Messrs. Franck, Hathaway, Sandys and Leigh.

Beatty School.—The following pupils were out during last week: Messrs. d'Allesina, Schollaert, Jaquin, Atkin, Smith, Tjaarda, Cuthbert, Barrow, Mossop, Sellars, Stanley, Hoskins, Martin, Roberts, Knox, Brewerton, Phillips, Dowding, Gaskin, Earl, Skeet, Davy, Garlick, Gliksten, Kay, McPherson, Mitchell, New, Jones and Drewery.

The instructors were Messrs. G. W. Beatty, R. W. Kenworthy, G. Virgilio, H. Sykes, A. E. Mitchell and H. Fawcett, the machines in use being Beatty-Wright dual-control and single-seater propeller biplanes and Caudron dual-control and single-seater tractor biplanes.

Mr. d'Allesina took an excellent ticket on Wednesday.

Hall School.—Pupils receiving instruction during last week were: Smith, Cosgrave, Mahoney, Duncan, Glegg, Milburn, Halliday, Rochford, Dickson, Rand, Hooker, Pennell, Capt. Deane, Collier, Gaskell, Armitage, Dodds, Neal, Illingworth, Davies, Robinson and Thom.

Instructors: P. G. Allen, C. Bell, C. M. Hill and H. F. Stevens.

Three Royal Aero Club certificates were taken by Neal, Thom and Milburn.

London and Provincial Aviation Co.—Pupils doing rolling last week: Messrs. Birkbeck, Whittingham, Kent, Evernden and Quayle. Doing straights: Messrs. A. Dawson, L. Pulford, C. Crawford, W. Egelstaff, F. T. Woods and F. Moore. Circuits and eights: Messrs. Frost, Foley, Creaghan and Aldous.

Instructors: Messrs. W. T. Warren, M. G. Smiles, W. L. Hay and W. T. Warren, jun.

Certificates were taken by Messrs. S. J. Frost and G. H. Foley.

Ruffy-Baumann School.—Pupils with instructor last week: Messrs. Dobson, Fanshawe, Wilson, Carr, Fraser, Straus, Bailey, Johnstone, Maya, Torres, Edgar, Portella, Westlake, De Balme and Williams. Doing straights or rolling alone: Messrs. Bailey, Wood, May, Whitaker,

Winter, Fraser, and Williams. Eights or circuits alone: Philip Wood doing good circuits at 500 ft.

Instructors during week: Messrs. Ed. Baumann, Felix Ruffy, Ami Baumann, André Thomsen and Clarence Winchester.

60 h.p. and 50 h.p. Ruffy-Baumann tractor biplanes in use.

Certificate was taken by Philip Wood, who accomplished *vol plané* from over 1,000 ft. His test flights were an excellent performance.

Bournemouth School.

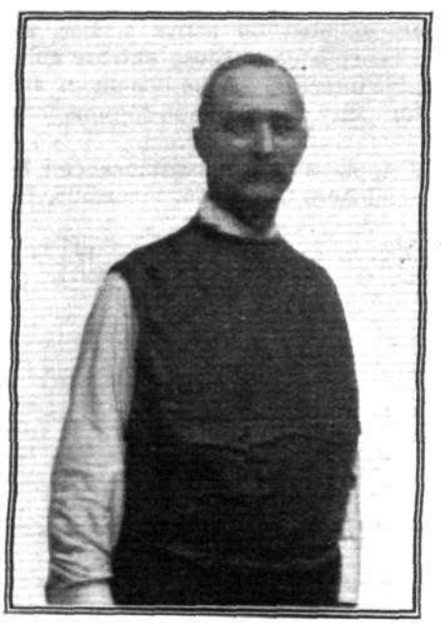
Pupils rolling last week: Messrs. Adamson, J. L. Barlow, Brandon, Daniels, Gordinnue, Kennedy, Pritt, and Scaramanga. Straights alone: Messrs. Smith, J. Wilson, O. Wilson, Morley, G. Mouton and Morris. Half-circuits alone: Messrs. W. Mouton, Simpson and G. Mouton. Eights or circuits alone: Messrs. W. Mouton, G. Mouton and Simpson.

Instructors: Messrs. S. Summerfield and Brynildsen.

Certificate taken by Mr. W. Mouton in very good style.

A NON-METALLIC BODY SHIELD.

LAST week a demonstration was given by the County Chemical Co., Ltd., of Bradford Street, Birmingham, of a new body shield, to which they have given the name of "Chemico," and which they are now introducing to the market. Its purpose is the resisting of revolver bullets, spent rifle bullets, sword, bayonet, or lance thrusts, flying shrapnel, &c. As will be seen from our photograph, the garment consists of a waistcoat which protects either the front part of the body, or, in its double form, front and back at the same time.



The new "Chemico" bullet and bayonet resisting body shield of the County Chemical Co., as worn.

The same principle is put forward for the protection of radiators, petrol tanks, and other vulnerable parts of either an aeroplane or motor car. In this body shield there is nothing in the nature of steel, it being of a flexible material, from which there is not the slightest risk upon impact, of the added danger to the wearer of either splintering or fracturing. The invention appears to be particularly apposite just now, when so many of our men may by wearing this extra protection, not only avoid death but escape being wounded at all, or be so slightly affected as to necessitate no retirement from the fighting line.

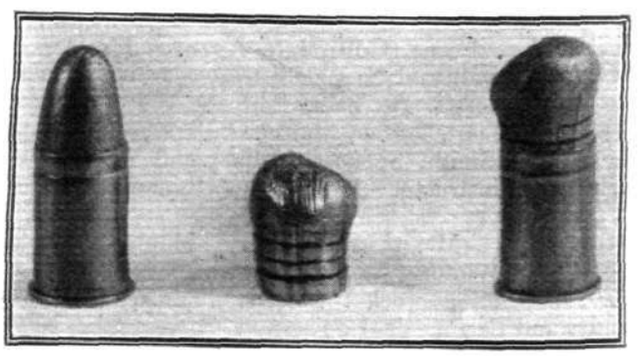
At the demonstration at Anderton's Hotel, owing to specially unsuitable conditions, one or two of the tests were not perhaps as successful as the inventors might have desired. The dummy on which the body shield was fitted was fired at continually from a distance of 4 yards with a Colt revolver, the bullet of which has a velocity of 700 ft. per second. This test followed one in which a private in the Dragoon Guards, who had returned from the front and had been asked to attend for the purpose, had made a dozen or more full strength lunges with a service bayonet from a distance of about three feet, the body shield being in no way affected beyond the slight puncturing of the outside covering. This first test had so disarranged the "dummy's" internal stuffing that the shield did not "sit" evenly as would be the case when on a human body.

The inventors have been experimenting for a considerable time, and now claim to have brought the shield to perfect efficiency, and recently it has been under the consideration of the War Office, at whose suggestion various improvements in regard to shape, etc. have been made. It is claimed that it could be made absolutely bullet and bayonet thrust proof, subject only to the governing factor of weight, and this, of course, is an important matter in equipping men for active service. As it is, the weight has been brought down to 2½ lbs. for a shield for the front of the body, and 4¾ lbs. for a shield protecting both back and front.

The principle of the protection appears to be by means of a series of strips of fabric of about 2½ ins. wide, right across the body, each strip being doubled. These overlap each other in such a manner that there are never less than 20 double thicknesses of this fabric or 40 single thicknesses at any single point.

After some of the test shots, upon personal examination we found that the bullets fired from 12 ft. away were stopped at the eighth layer of fabric, comprising 16 single layers; leaving therefore still twelve double fabric layers as reserve against the bullet penetrating completely through. The shield is rendered perfectly antiseptic, by a special treatment, and we understand that they are to be put on the market at the low price of 27*s.* 6*d.* for the single shield, and 47*s.* 6*d.* for the double.

With the idea that many parents and wives, whose kith and kin are at present at the front fighting, may wish to provide their dear ones with a protection of this sort, the President of the County Chemical Co., Mr. Wilfred Hill, stated the Company had decided to place this humane proposition at the disposal of all those who are anxious and able to give the men an extra chance of coming out of this horrible war unscathed. The Company has deemed it desirable to do this, although the directors are hoping that the authorities will before long arrive at some more extended policy in regard to taking the matter up officially. It is hoped in addition to thus placing the body shield upon a commercial basis, to also make arrangements, in cases where it is demonstrated that the relatives are desirous of sending out this shield to soldiers at the front, and are not in a position to pay the price at which it is



Testing the new "Chemico" bullet resisting body shield. On the left a Colt revolver lead bullet before discharge. In the centre the bullet after it has struck the "Chemico" resisting shield, and on the right a spent bullet replaced in its case.

marketed, to give facilities for having the shield sent direct to the soldier at absolutely cost price. But, of course, this would be a matter for arrangement in each individual case.

There can be no question that the introduction of the shield should prove a most valuable saver of lives, and we congratulate Mr. Wilfred Hill and his directors in having taken the present steps to give our troops and those of our Allies the benefit of its qualities before the present war has claimed a further unnecessary toll of human life.

WHAT a wonderful thing is an Act of Parliament. All my life I have been thinking about getting up earlier in the morning, and have been able to manage it only on very rare occasions.

I leave out of account those times when I have had to rise early to catch trains, and think only of those when I have risen early solely to be able to lord it over those sluggards rising at reasonable times. For what is the use of rising early if everybody does the same? All the glory in rising early is contained in being able to enquire politely what time others were up and doing.

Now, I suppose I shall not only have to rise an hour earlier than I have been in the habit of doing, without the chance to boast of it, but I shan't even be aware of it myself.

By Act of Parliament, if the Bill passes, I shall have to put my clocks on an hour, and try to forget it. This may work very nicely in the mornings, but I doubt very much whether I am going to seek my bed at eleven at night when I know quite well the clock is lying to me, and shall still burn the midnight oil, the real midnight oil, when it becomes the question of an interesting book. Nor shall the call from the regions above shame me when it asks whether I know the time, for I shall answer truthfully that it isn't.

All I can see in it is that I shall get six or seven hours' work a week out of myself in excess of that which I now do. I don't suppose that will do me any harm, for I am an awful slacker. I have no doubt I shall readily fall into the custom of leaving the office an hour earlier in the evening, but so be that I am a bit late in the morning, I shall have to drive myself with a tight rein that I do not start to argue the point as to real time and imaginary time.

After all, there is nothing in time, really. I should like to impress this upon those pilot-instructors who rise now somewhere round about three A.M. It will be a great solace to them if they can only make up their minds that when they rise at three, it isn't really three, but two. Especially will this be the case when they also remember that time does not enter into their finishing time, which is governed by daylight. I can imagine them having a right merry time. I should not be surprised if after having sampled the new clocking, they come to the conclusion that there is something after all in the old axiom that "Time is time," with a goodly chunk over as makeweight.

The new Bill, if it comes to pass, will not affect me personally so very much. I like to feel that I am economising in war time, and they tell me that this is for economy's sake. I don't quite see where it comes in myself, but that does not matter. I am doing something to help on the war, and that is sufficient.

Some people like being governed: I don't. So I am going to start my early rising to-morrow morning of my own free will, before I have to. I am not quite sure whether there is such a thing as free will, but I am quite sure my early rising to-morrow is going to create a rumpus. Women are so inconsiderate, and there is sure to be some passage of arms about "rousing the whole household at unreasonable hours." That is simply because I shall do it voluntarily. Next week when it is vouched for by the clock that the hour is reasonable, it will be all right. Women don't know anything about clocks.

I never knew a woman yet who knew for certain whether to put the regulator over to "F" or "S" when a clock gains, and when it comes to "V" and "R"—well! It is almost as great a mystery to them as the knowledge of whether a gas-cock should be turned across the pipe or following its direction, to shut the gas off. Or that screws can only be driven in by turning them one way. Or that cards are dealt round in the same direction. Or anything but that man is a confounded nuisance to be getting up so early in the morning, disturbing everybody, and that the maid will give notice, "and I don't wonder at it," and maids are so hard to get just now. But I shall enjoy it, because I shall have such little time to do it voluntarily: next week I shall be acting under orders.

I have no doubt I shall make enough noise to "waken the neighbourhood," and that I shall over-feed the fowls, and do all sorts of wrong things.

Women have got a way of saying "Ah!" with, oh such a wealth of expression behind it, when they come out top dog in anything, and now I come to think about it, I am not quite sure whether I should be able to escape that awful word, should I rise early to-morrow.

It has just struck me that as the kitchen fire will not be alight, there won't be that little drop of hot water to put in my bath without letting anybody know. Then there is shaving water to be considered. I can't reasonably be expected to go down and get that for myself: besides, I don't know what they heat it in.

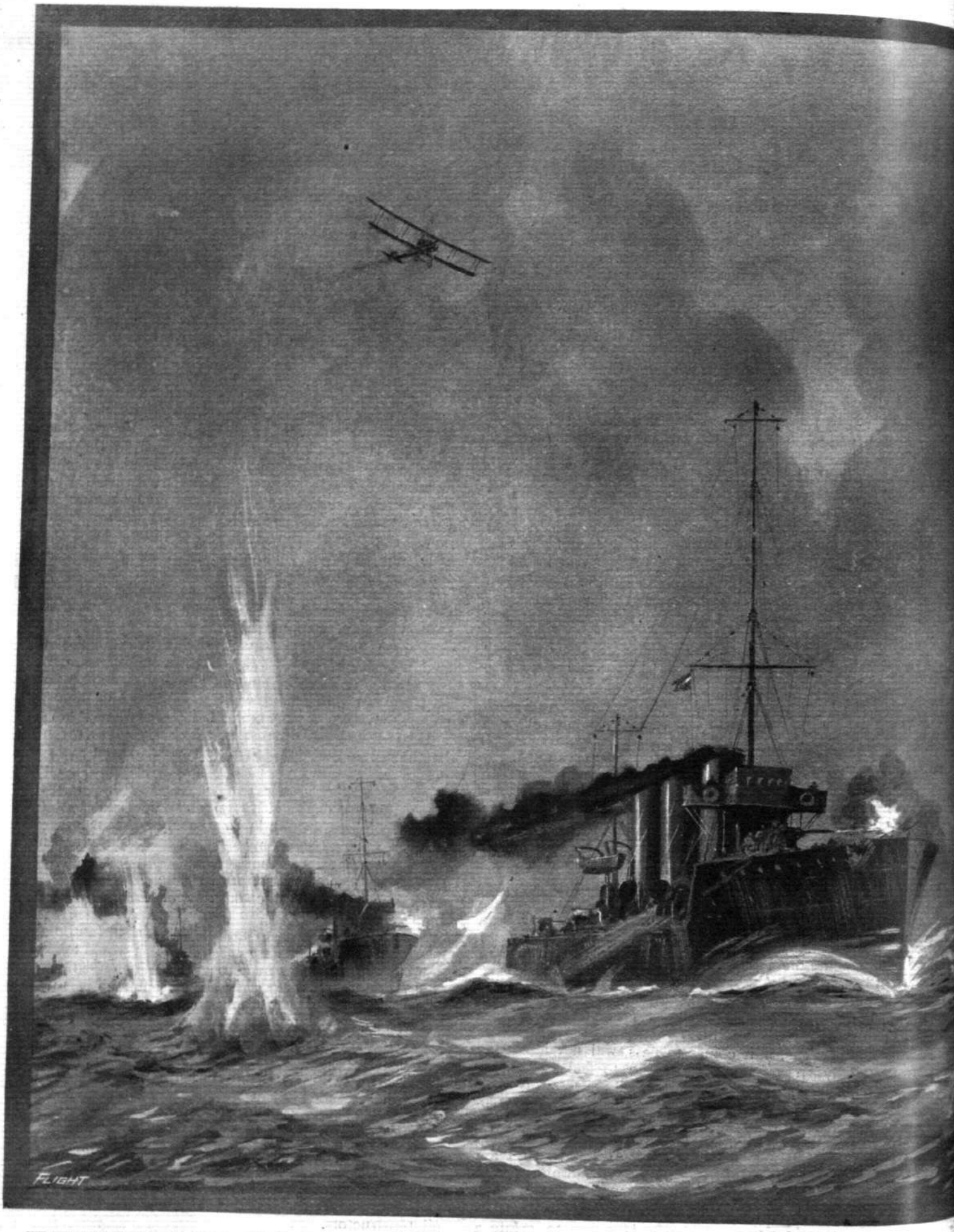
I hate having to cook my own breakfast, to say nothing of the fact that I can't mess about with porridge, and eggs, and bacon, and toast, while, furthermore, I don't know what they cook it in, or even where they keep it.

Even though I were to manage it all right (and make no mistake, I could if I wanted to, Ah!) it would take up quite the hour I had hoped to gain. Women can lay a good breakfast in next to no time, but then it is their work, and nothing to strut around about.

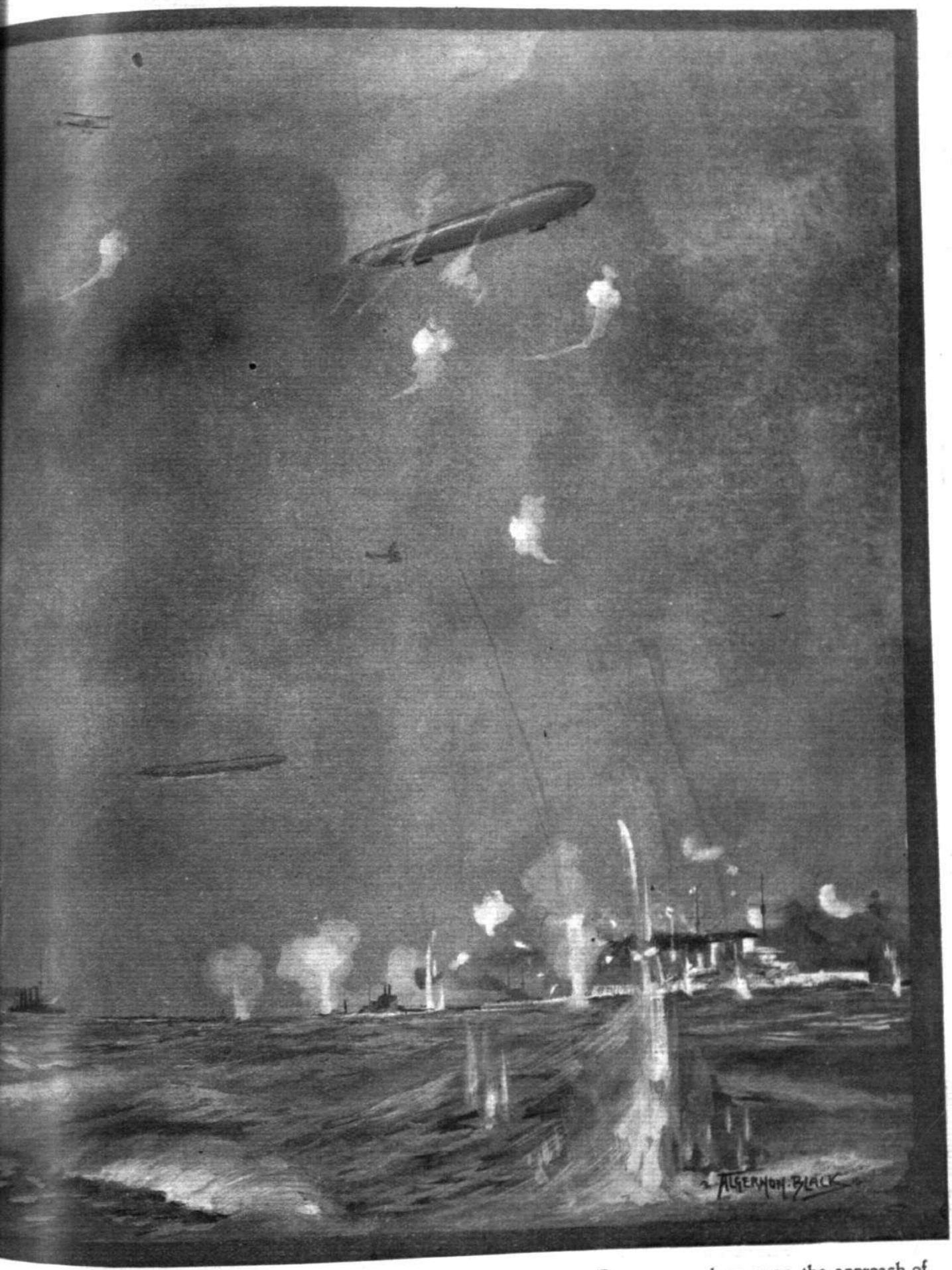
I might get up and go out for a walk, only I don't know where they keep the boot-brushes, and, anyway, I hate cleaning boots. Perhaps after all I'll wait and see. The Bill might not pass, and I don't want to do anything to show how independent we men are of women when there is no occasion for it.

When the clock is put on by Act of Parliament, they won't know anything is wrong. I'd try putting it on secretly to-night, but if I do, they'll bundle me off to the office too early.

Anyway, I'm glad I'm not a pilot-instructor. Poor pilot-instructors.



THE EAST COAST SEA AND AIR RAID.—A drawing by Mr. Algernon Black of the recent powerful
two or three of our small destroyers and torpedo boats, took to flight at full speed, after bombarding the seaside t
submarines, and the Zeppelin airships which acted as the German Navy's

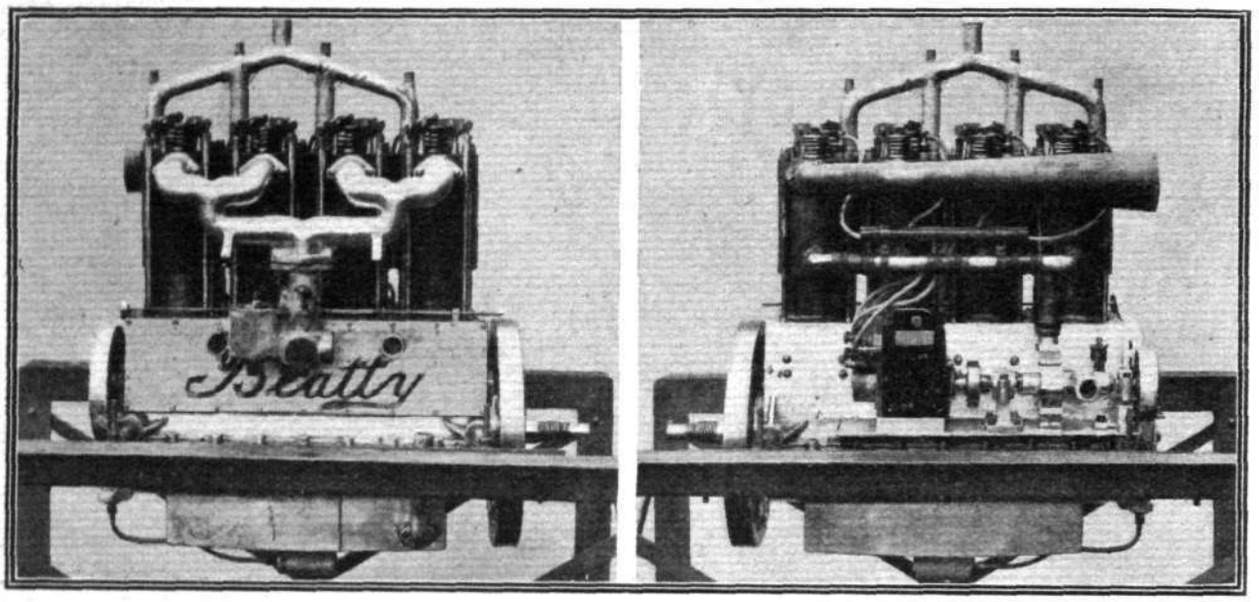


squadron raid at 4.30 a.m. upon Yarmouth and Lowestoft, when this big German squadron, upon the approach of
During the battle seaplanes and landplanes took a prominent part against the German battle-cruisers, the German
one of our planes pursuing the Zeppelins for 60 miles across the seas.

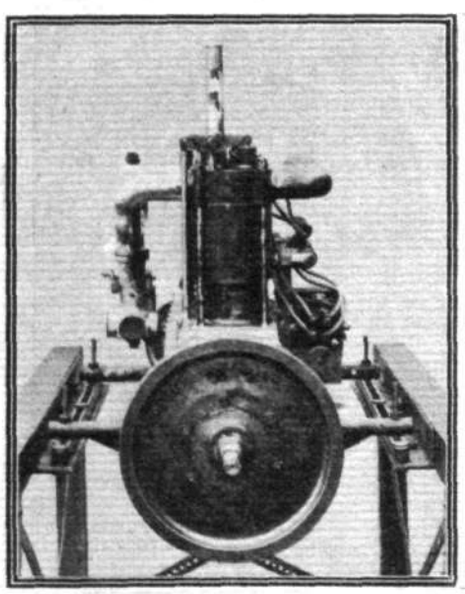
THE NEW 50 H.P. BEATTY ENGINE.

AFTER more than a year of tests and experiments the evolution of the four-cylinder Beatty engine has now reached a stage where its maker is satisfied with its performance, both as regards the power developed and the reliability shown during test runs, on the bench, of more than three hours' duration. In its present form the 50 h.p. Beatty engine differs considerably from the first engine produced in 1914. In the first place the automatic inlet valves with which the older type was fitted have been supplanted by mechanically operated ones, a feature that has undoubtedly been to a very large extent instrumental in helping to raise the power from 40–45 h.p. to 50 h.p. Inlet as well as exhaust valves are made of nickel steel, and it is only after considerable trouble and expense that a satisfactory valve has been found. The horizontal pressed steel tappet levers, whose object is to relieve the push rods of all side strain, have been retained. The camshaft rests in bearings on one side of the internal webs of the crankcase, and the cams, which are so shaped as to give very quick lift, are integral with the shaft, which is machined out of a solid bar of steel.

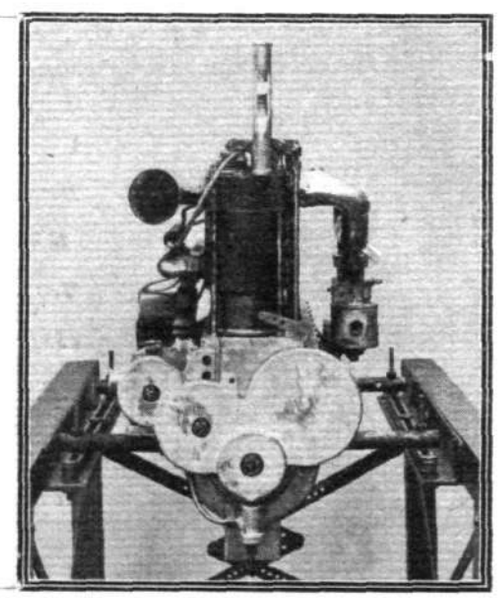
Each of the four cast iron cylinders, which have steel water jackets, shrunk on, is held down by four long bolts passing through lugs on the cylinder head, whereas in the older type the cylinders were secured to the crankcase by short studs passing through a flange at the base of the cylinder. In order to facilitate inspection the aluminium crankcase is made in two halves, the lower of which is a thin light shell about $\frac{1}{8}$ in. thick, with which is cast integral a small sump having an inspection glass on one side. Both upper and lower half of the crankcase are well webbed for rigidity, the webs in the upper half being cast to form the bearings for the crankshaft, which is a solid chrome nickel steel forging machined all over and running in five bearings. An inspection of the accompanying sketch will give a good idea of the accessibility to both shafts provided by the split crankcase and the detachable inspection cover running the whole length of



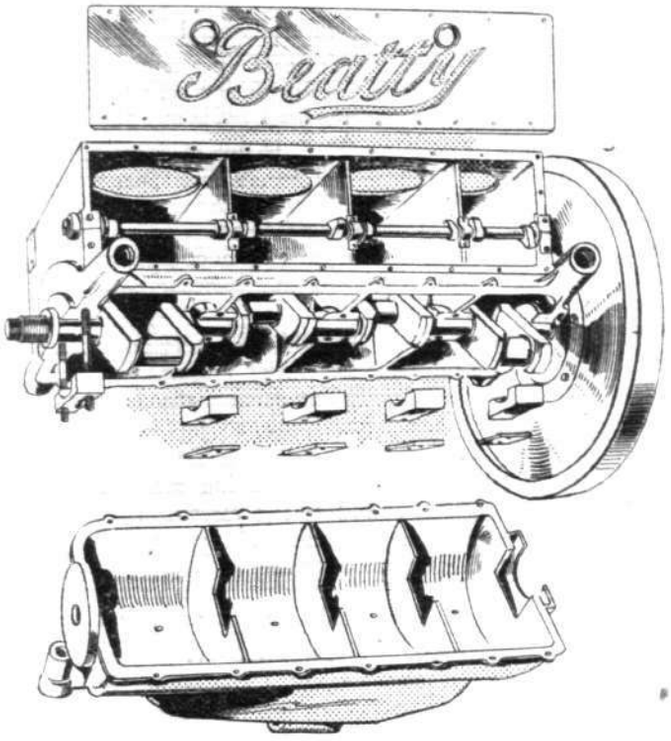
Both sides of the 50 h.p. Beatty water-cooled engine.



Gear end and flywheel end of the new 50 h.p. Beatty water-cooled engine.



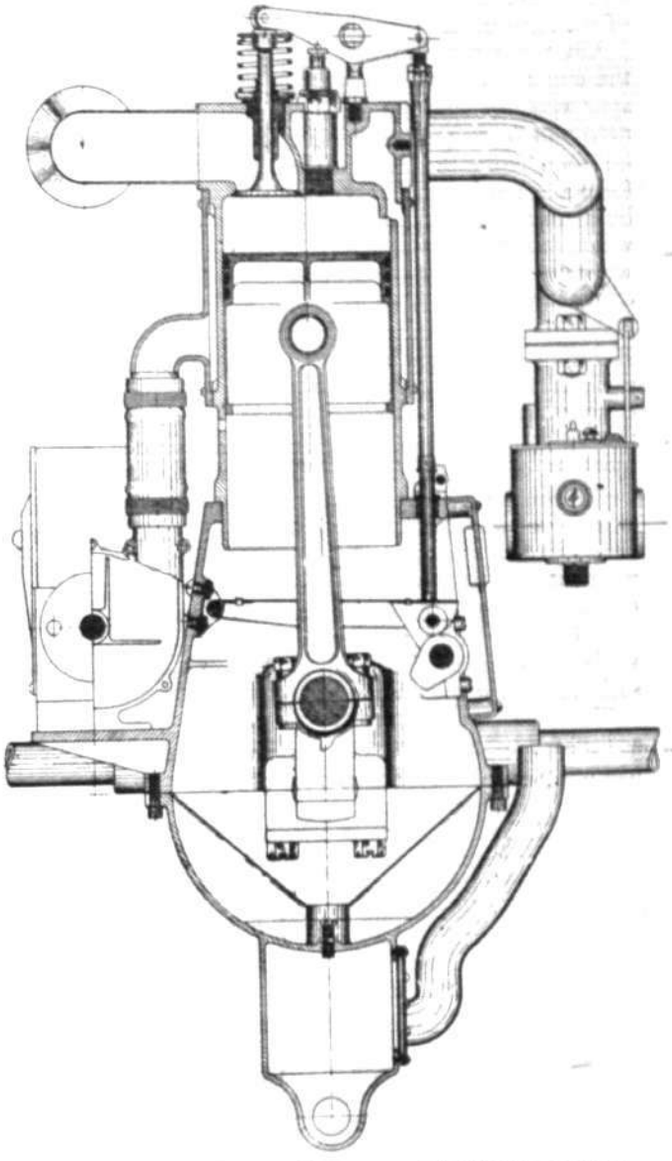
one side of the upper half of the crankcase. The method of supporting the crankshaft bearings will also be evident from the sketch. The upper half of the bearing is, as has already been said, formed integral with the internal web. The lower half of the bearing cap is also made of aluminium, and underneath it is placed a steel plate, two bolts passing through cap and plate into the web of



Analytical sketch illustrating accessibility of the 50 h.p. Beatty engine.—The lower half of the crankcase and the side inspection cover are shown removed so as to show the general construction of crankcase, shafts, &c.

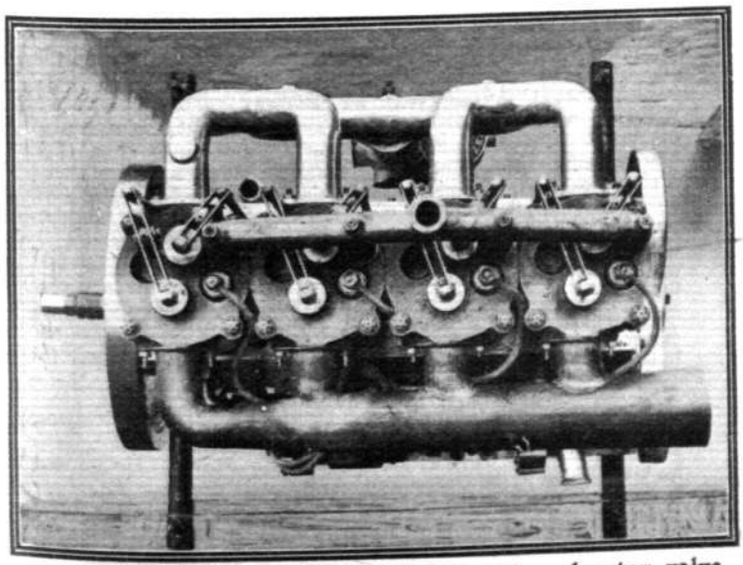
the upper half securing the bearing. When the lower half of the crankcase is removed the engine can be, if desired, swung right round, and any adjustment to bearings, &c., made with the greatest ease.

On the rear end of the crankshaft is mounted a fly-wheel—the engine being designed for use on the Beatty-Wright biplanes, which have, as is of course well known, chains drive to the propellers. If it is desired to use the engine on a tractor machine, and direct drive is preferred,

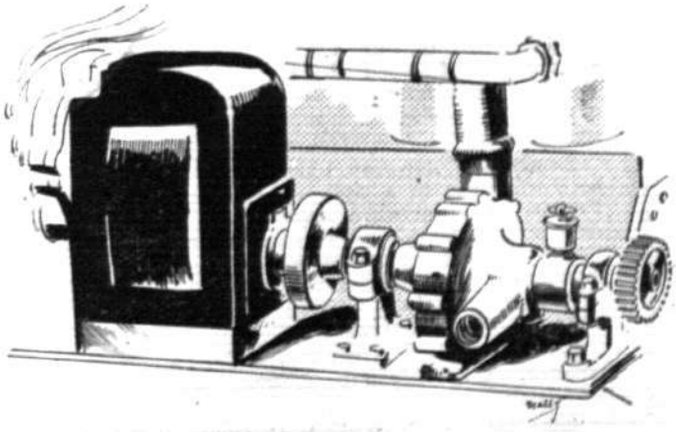


Sectional end view of the monobloc Beatty engine.

provision has been made to incorporate a thrust bearing with the gear wheel on the other end of the crankshaft, the engine being then reversed end to end, so that the



View from above of the 50 h.p. Beatty engine, showing valve rockers, sparking plugs, &c.

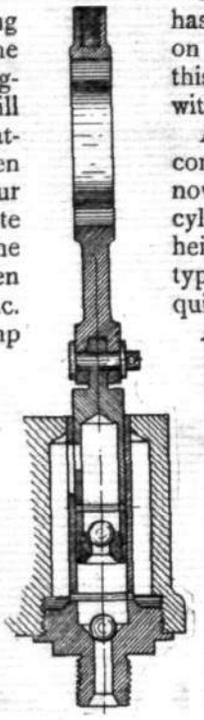


Sketch showing the water pump and magneto drive on the 50 h.p. Beatty water-cooled engine.

flywheel is in the nose of the machine. This adaptability for conversion into direct drive should be of importance in that it enables the engine to be used on ordinary tractor machines, thus considerably widening the scope of its usefulness.

On the front end of the crankshaft—regarding the engine as fitted up for the chain drive—is the spur wheel driving the half time shaft and the magneto and water pump. The two latter are, as will be seen from the illustrations, mounted on a platform on one side of the crankcase, and are driven by a shaft running on ball bearings from the spur wheel on the crankshaft through an intermediate wheel as seen in the end view of the engine. The oil pump, which is of the plunger type, is driven from the crankshaft by means of an eccentric. Running as it does at crankshaft speed, the pump delivers oil at a highly satisfactory rate, in fact on one occasion, when a piece of the gauze in the sump got clogged up, the pump sucked it into one of the oil leads. The oil is drawn from the sump and passed through a tube running along one side internally in the crankcase. Holes are drilled in this tube at certain intervals in line with each connecting rod, and a constant stream of oil is always being played on the big ends. The lubrication of the small ends and cylinder walls is by splash, which method has been found satisfactory for the engine in question.

The pistons are of the three ringed type, and are stiffened by internal webs under the piston head. Like the cylinders, they are made of cast iron. Instead of the tubular connecting rods employed in the earlier model, these are in the latest engine made of H section high tensile steel. The big ends are fitted with white metal die cast bearings, while the small ends have phosphor bronze bushes keyed in. The whole engine is supported on four tubes screwed into four arms cast integral with the upper half of the crankcase, thus facilitating alignment.



Sectional view of the plunger type oil pump on the Beatty engine.

Although the engine shown in the photographs has separate cylinders, the latest type, which is now on test, has *bloc* castings, and we understand that this type comes out about 5 lbs. lighter than that with separate cylinders.

Also the *monobloc* engine will be even more compact than the present one, since the water leads now projecting some distance above the top of the cylinders will disappear, thus reducing the overall height considerably. As it is, the separate cylinder type has an overall length of 29 ins. only, which is quite short for a 4-cylinder engine.

A good idea of the *monobloc* engine can be formed from an inspection of the accompanying line drawing, which shows the compactness of the design very well.

A feature which should add very considerably to the usefulness of these engines is that all parts are absolutely interchangeable, as all the machining has been done to jigs and gauges, Mr. W. F. Claxton, who is responsible for the detail work of the design, having made a special point of going round to the various firms manufacturing the parts to check everything during the course of manufacture to make assurance doubly sure.

Altogether Mr. Beatty is to be congratulated upon having produced a reliable engine eminently suitable for school work. The power developed is 50 h.p. at 1,600 r.p.m., and the bore and stroke are $4\frac{3}{8}$ ins. and $4\frac{1}{2}$ ins. respectively. The fuel consumption is 4·28 gallons per hour, and the weight of the engine complete but without radiator is 248 lbs.

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PERSONALS.

UNDER the above heading will be published weekly particulars of a personal character relating to those who have fallen or have been wounded in the country's service, announcements of marriages and other items concerning members of the Flying Services and others well known in the world of aviation. We shall be pleased to receive for publication properly authenticated particulars suitable for this column.

Casualties.

Major V. A. BARRINGTON-KENNETT, of the Royal Flying Corps, who was reported missing in March last, is now unofficially reported killed. He obtained his pilot's certificate in March, 1912, and was gazetted Flight-Commander in June, 1915. He was shot down by a German aeroplane during a fight in the air. He was flying alone when he met his death. He was educated at Ludgrove School, Eton, and Balliol College, Oxford, where he graduated with honours. He was recommended in despatches "for gallant and distinguished service in the field." He is the third son of Lieutenant-Colonel B. H. Barrington-Kennett, H.M. Body Guard, to fall in the war. Brevet-Major Basil H. Barrington-Kennett, Grenadier Guards, was killed on May 18th, 1915, aged 30, when leading his company under a heavy fire, and Second Lieutenant Aubrey Hampden Barrington-Kennett, of the Oxford and Bucks Light Infantry, fell at the battle of the Aisne, aged 25. Colonel Barrington-Kennett's only surviving son, Godwin Austen, is serving in East Africa.

Lieutenant J. HUTTON FREEMAN, of the Royal Flying Corps, has been killed in a flying accident in Flanders. Lieutenant Freeman had a marvellous escape on March 27th last. He experienced engine trouble when attempting to fly from Farnborough to France, and dropped from a height of 3,000 ft. near Walton-on-Thames. The biplane was smashed, but Lieutenant Freeman was practically uninjured. Lieutenant Freeman rowed for Radley College at the last Henley Regatta.

Lieutenant JAMES MITCHELL, R.F.C., whose death is officially reported, was formerly in the Canadian Infantry. He was killed on April 26th.

Sub-Lieutenant CYRIL J. A. MULLENS, R.N.V.R., one of the officers reported by the Admiralty as missing after the air fight off the coast of Flanders on May 5th, is now officially reported to have been drowned. He was 19 years of age, and the only son of Mr. John Ashley Mullens, partner in Messrs. Mullens, Marshall and Co., of 13, George Street, E.C., the Government brokers, and of Mrs. Mullens, 31, Lowndes Square, and Barrow Hills, Longcross. Educated at Eton, he had just entered at Cambridge before he joined the Royal Naval Air Service, and for some little while recently had been doing successful work as an Observer. He was the nephew of Brigadier-General R. L. Mullens, who some months ago was incapacitated by German asphyxiating gas.

Lieutenant CHARLES WALTER PALMER, R.F.C., who was wounded and taken prisoner in an air fight on March 2nd, died of blood poisoning in an internment camp in Germany on March 29th at the age of 24. He was the eldest son of Mr. and Mrs. George A. Palmer, of Wykin, Hinckley, and obtained a commission in the Duke of Cornwall's Light Infantry at the outbreak of the war, being subsequently gazetted to the Royal Flying Corps. Lieutenant Palmer was with Lieutenant H. F. Birdwood when the latter was killed. Lieutenant Palmer wrote a cheery letter home on March 18th, the day after he had his foot amputated, to say that he hoped soon to be well and exchanged. His superior officer writes of him as "a splendid pilot, whose loss is a great blow to the squadron."

Wounded.

Second Lieutenant ROBERT L. DUNVILLE, Grenadier Guards, who has been wounded in Ireland, is the eldest son of Mr. John Dunville, Redburn, Holywood, and Sion, Co Meath. He received his commission in the Grenadier Guards last December. His father is well known in aeronautical circles, being a member of the Royal Aero Club Committee and of the Irish Aero Club, and is at present serving in the Royal Naval Air Service. Lieutenant Dunville's second brother—Second Lieutenant John S. Dunville—is in the Inniskilling Dragoons.

FLIGHT

QUESTIONS IN PARLIAMENT.

Lord Curzon's Report.

ON May 2nd Mr. E. Cecil asked whether any action had yet been taken on Lord Curzon's report to the Cabinet on the organisation of the Aviation Department, and whether the Prime Minister had any statement to make.

In reply Mr. Asquith said it was impossible to give a day for the promised debate during that week.

Mr. Hogge on Monday asked the Under-Secretary for War whether he would say what were Lord Curzon's recommendations for the air service.

Mr. Tennant replied that the matter was under the consideration of the Government. It would be premature to make a statement.

Asked by Sir F. Canley on Tuesday if he could fix an early day for the discussion of the report, Mr. Asquith replied in the negative, explaining that he was dependent on the progress of the new Military Service Bill.

Anti-Aircraft Corps.

SIR CHARLES HENRY, on May 3rd, asked if any steps were being taken to release members of the Anti-Aircraft Corps who would be eligible for military service, and to replace them by men who are over military age?

Mr. Tennant stated that the reply was in the affirmative.

The New Headquarters of the War Office Aeronautical Department.

REPLYING to Mr. Ashley, on May 4th, Mr. Harcourt, the First Commissioner of Works, said that De Keyser's Royal Hotel, Victoria Embankment, had been taken over for occupation by the Aeronautical Department of the War Office. No estimate of cost of adaptation had yet been framed. The premises had been requisitioned under the Defence of the Realm Act, and the question of compensation would therefore be settled by the Commission especially appointed to deal with such cases.

In reply to a further question, he stated that no accommodation of a less expensive kind was to be obtained near the War Office.

Aircraft Raid Insurance.

MR. TICKLER asked the President of the Board of Trade if claims arising out of bombardment by enemy aircraft were being declined on the ground that the insured had also signed the coupon of a weekly paper, which paper refused to accept liability on account of the claim not being made against it in the prescribed time; and, seeing that the Government refused to pay the damage insured for until the insured had exhausted the funds of the weekly paper, what action he now proposed to take.

Mr. Pretyman, who replied, said: It is a special condition of the Government policy that the insured must exhaust his rights against any other subsisting insurance before claiming under the Government policy. A newspaper insurance coupon is a subsisting insurance, and I see no reason why the Government should relieve a newspaper of any liabilities which it may have legally incurred for its own purposes. The question of exhausting the funds of the newspaper does not, of course, arise.

Mr. Wing asked for an assurance that the Department will take some steps to bring those newspapers to book that make promises and don't perform them?

Mr. Pretyman: We have considered this matter carefully. The situation is a very difficult one. If my right hon. friend will kindly send us particulars of any actual cases that have occurred, we will look into them and see what can be done. It is very important to the insurers that where the newspapers are liable they should fulfil their liabilities; otherwise the insurer is left stranded between the two parties.

The War Office and Private Aircraft Factories.

MR. LYNCH asked whether, in view of the advisability of developing to the fullest extent the air-power of the nation, the War Office would take advantage of the services that various private aircraft factories, as, for instance, the Whitehead Aircraft Factory, are in a position to render and stimulate their efforts by suitable orders?

Mr. Tennant replied: Yes, sir.

British Zeppelins.

MR. HOGGE asked the Under-Secretary for War how many Zeppelins we possess.

Dr. Macnamara, Parliamentary Secretary to the Admiralty, who replied, said it was not considered in the public interest to give the information desired.

Bright Lights in West London.

SIR C. KINLOCH-COOKE wished to know whether the Home Secretary would give to the police instructions which would ensure the darkening of windows in hotels and private houses in West London at night.

Mr. H. Samuel replied that careful attention was given to the matter in all parts of London. In no fewer than 2,300 cases proceedings were taken in the metropolis last month.

Sir C. Kinloch-Cooke said many upper windows in West London were without blinds or, at any rate, darkened blinds. If the right hon. gentleman would let him, he would introduce him to several such windows.

Mr. Samuel suggested that the hon. member should give his information to the police.

Sir C. Kinloch-Cooke said he had already done so.

The B.E. 2c. Machine.

MR. BILLING on May 2nd asked whether as a result of recent criticism in the House on the inefficiency of the Royal Aircraft Factory aeroplane B.E. 2c, when opposed to enemy aircraft, orders had been given that no more of this type of machine were to be sent to France. Mr. Tennant replied that the answer was in the negative.

Essen.

MR. BALFOUR, replying to Mr. Ginnell, who asked if he would explain why Essen had been immune from attack by British aircraft, said: I do not think it would be desirable to discuss military operations—actual or possible—by question and answer.

THE R.F.C. INQUIRY.

REPLYING to Mr. Hogge in the House of Commons on Monday, Mr. Tennant said the following were the names of the Committee to inquire into the administration and command of the Royal Flying Corps:—

Mr. Justice Bailhache (chairman), Mr. J. G. Butcher, M.P., Mr. E. Shortt, M.P., Mr. J. H. Balfour-Browne, K.C., Hon. Sir C. Parsons, K.C.B., Mr. Charles Bright. The secretary was Mr. D. Cotes Preedy, 2, Elm Court Temple. It was also proposed to invite a military adviser of high rank to join the Committee.

On Tuesday Sir A. Markham asked why the Committee appointed to inquire into the administration of the Royal Flying Corps contained four lawyers among six members.

Mr. Asquith replied that he understood it was desirable that lawyers should be nominated.

Mr. Billing asked whether it was not desirable to appoint some aeronautical experts on the Committee?

Mr. Asquith replied that two members of the Committee are civil engineers of great eminence, and I understand that one of them, Sir Charles Parsons, is unsurpassed by any engineer in his knowledge of these matters.

With regard to the members of this Committee, the following are a few brief particulars of their past work:—

Mr. Justice Bailhache (chairman) (Sir Clement Meacher Bailhache) has been a judge of the High Court since 1912. He is a Yorkshireman, and was educated at the City of London School and London University. Called to the Bar in 1889, he speedily acquired a reputation as a sound and careful advocate. His appointment to the Bench was hailed with great satisfaction by the legal profession and by business men.

"Mr. John G. Butcher, K.C., Unionist M.P. for York. An Irishman and son of the late Bishop of Meath. Educated at Marlborough and Cambridge, he is a Fellow of his College, Trinity, and has a reputation as a scientist, apart from his high standing at the Bar.

Mr. E. A. Shortt, K.C., Liberal M.P. for Newcastle, is a native of Newcastle, and was educated there and at Durham University. He is Recorder of Sunderland, and one of the most popular barristers on the North-Eastern Circuit.

Mr. J. H. Balfour-Browne, K.C., is a Scotsman, who, until the beginning of this year, when he retired, was leader of the Parliamentary Bar. Educated first at Dumfries Academy, and later at Edinburgh University, where he had a distinguished career, he attained the highest position at the Parliamentary Bar, and was recognised as one of the acutest intellects in the profession.

Sir Charles A. Parsons, K.C.B., is the head of the famous electrical and engineering works bearing his name at Newcastle. At an early age he had a practical training as an engineer, and, proceeding to Cambridge, graduated in 1876 as Eleventh Wrangler. His name is indissolubly connected with the turbine, which he developed and adapted both to the generation of electrical energy and the propulsion of steamships.

Mr. Charles Bright, F.R.S.E., M.Inst.C.E., M.I.E.E., is a distinguished engineer and expert on telegraph cables, consulting engineer to the Commonwealth of Australia, &c., and has been professionally engaged on a number of cable-laying expeditions in various parts of the world.

THE SPECIFICATION OF STEEL.

By A. E. BERRIMAN, M.I.A.E. (Chief Engineer of the Daimler Co.).

THE publication of the Engineering Standards Committee's specifications for automobile steels* inaugurates a new phase in the progress of this industry, and renders important assistance to its allied branch of aircraft manufacture.

Ten classes of steel have been labelled by these official specifications, and they cover the whole range of the more important kinds in common use.

There are four case-hardening steels and six steels that may be called, for distinction, stamping steels.

The E.S.C. specifications are wide, that is to say, they define classes rather than "brands."

This is as it should be. There is nothing to prevent users with particularly definite requirements from obtaining special casts of steel to guaranteed fine limits of chemical composition.

The specifications themselves were drawn up by a Committee of the Institution of Automobile Engineers, comprising steel makers, stampers and automobile manufacturers. The steels specified, therefore, may be taken as representative of average requirements.

The formation of the Committee in question was the direct outcome of a paper read by Mr. L. H. Pomeroy, Technical Director of Vauxhall Motors, Ltd., before the I.A.E. during the early part of the war.

It must be remembered that all the steel used in motor cars is "special" from the standpoint of ordinary engineering construction. These specifications are, therefore, a first attempt to define the more commonplace materials of a particular group.

So far from handicapping development, this standardisation of what is merely ordinary should promote intelligent interest in what is really new. Undoubtedly, much confusion of mind hitherto has prevailed among steel users about matters well known by steel makers to be relatively insignificant.

The standardisation of these steels has prepared the way for an important line of research that has been undertaken by the Joint Research Committee of the Society of Motor Manufacturers and the Institution of Automobile Engineers. The funds for this research have been contributed partly by the Government, partly by the S.M.M.T., and partly by individual firms in the automobile industry. The object of the research is to test the physical properties of the standard steels over the range of chemical composition tolerated by the specifications and over the range of heat treatments appropriate to the class of material.

When this information is published, the full value of the specifications themselves will be realised, and the automobile industry will have acquired a collection of data that has long been wanting as the basis of scientific design.

Under the ordinary conditions of commercial production, it is essential that the engineering department's specification should give sufficient latitude for the proper exercise of the functions of the purchasing department. This co-ordination is much facilitated by the E.S.C. standards, for it is now possible for the engineering department to place a thoroughly definite specification on the drawing without limiting the source of supply.

Such a specification might read, for example, 3 per cent. nickel chrome steel to fulfil R.A.F. Test No. 32a. This ensures the supply of an appropriate class of material for the work, and its use in a suitable heat-treated condition; at the same time, it enables the entire steel industry to compete for the business on even terms.

It is, however, necessary to remember that much of what constitutes "quality" in steel appertains to detail of manufacture that cannot be recorded in the chemical composition, and is not necessarily apparent in the physical tests. Reputation, both for good material and for good service is, therefore, likely to be much more securely founded in the full light of the standard specifications than ever it was before under the vague glamour of a "brand."

In the long-run, it will be worth more to the steel maker to supply the best steel of a universally used class, than a very good steel of an isolated kind.

The specification of high quality was not really faced by the Committee responsible for drawing up the E.S.C. standard steels, and there is no doubt that useful work remains to be done in this direction by any representative group of steel makers willing to concentrate upon the subject. The absence of a quality clause in the E.S.C. specifications is no detriment to their fundamental purpose, for it must be remembered that quality is a question of degree and therefore of price. It is undesirable in engineering to employ steel that is unnecessarily costly for its purpose, and it would be a mistake for the standard steels arbitrarily to define only the highest quality, and, therefore, the most expensive class of material. It is, however, important that engineers should be able effectively to specify the highest quality when they require it. On this aspect of the subject authoritative information is at present lacking. To say, for example, that a steel must be crucible cast, is perhaps to take a very arbitrary action in respect to the capabilities of the electric furnace, which may be able to produce the highest quality steel more economically. Similarly, there are points in connection with the casting of the ingot and its subsequent preparation into the billets and bars of commerce on which the steel making industry might well prepare some authoritative information that would serve as a most useful supplement to the existing E.S.C. standard specifications.

The accompanying table summarises the E.S.C. standard steels, and gives additional information relating to the testing of steel.

Check tests for steel that is bought for stock purposes are included in the E.S.C. specifications. Most of them are specified for annealed test bars in order to facilitate uniformity of the conditions under which the steel is checked.

Steel that is bought for a particular purpose as defined by a special test must necessarily be the subject of special arrangements as between the purchaser and the supplier.

In principle, the responsibility for producing the results should coincide with the source of the specification; and the appropriate source for the specification is the firm undertaking the heat treatment.

In short, if the steel maker supplies heat-treated steel, he should be wholly responsible. If the stamper heat treats the steel, he should be responsible for the specification and for the results, the steel maker being merely responsible for the standard check test. If the engineer

* Report No. 75.

E.S.C. Standard Steels.

	Case Hardening Steels				"20" Carbon	"35" Carbon	3% Nickel	1½% Nickel Chrome	3% Nickel Chrome	NC Air Hard
	"10" Carbon	"15" Carbon	2% Nickel	5% Nickel						
Carbon	·08/·14	·12/·20	·10/·15	†·15	·15/·25	·30/·40	·25/·35	·25/·35	·20/·30	·28/·36
Silicon	†·20	†·20	†·30	†·20	†·25	†·30	†·30	†·30	†·30	†·30
Manganese	†·60	·65/·10	·25/·50	†·40	·40/·85	·50/·85	·35/·75	·35/·60	·35/·60	·35/·60
Sulphur	†·04	†·07	†·05	†·05	†·06	†·06	†·04	†·04	†·04	†·04
Phosphorus	†·04	†·07	†·05	†·05	†·06	†·06	†·04	†·04	†·04	†·04
Nickel	—	—	2·0/2·50	4·75/5·75	—	—	2·75/3·50	1·25/1·75	2·75/3·50	3·50/4·50
Chromium	—	—	—	—	—	—	—	0·75/1·25	·45/·75	1·25/1·75

Check Tests.

Solely to provide a uniform basis for checking consignments irrespective of the state in which the steel is to be used.
The test bar must be heat-treated when 1⅛" in diameter.
Treatment :—N = Normalised ; OH = Oil hardened ; AH = Air hardened ; T = Tempered °C.

Treatment °C.	N 900/920	N 890/920	N 850/900	N 820/860	N 890/920	N 850/880	N 840/880	OH/850 T 600	OH/820 T 600	AH 820
Max. stress tons/in²	23/28	25/33	25/35	25/40	26/34	30/40	35/45	*45	*45	*100
Elastic ratio %	*50%	*50%	*55%	*60%	*50%	*50%	*55%	*70%	*70%	*75%
Elongation	*30%	*28%	*30%	*30%	*28%	*25%	*24%	*15%	*15%	*5%
Reduction	*50%	*50%	*55%	*55%	*50%	*45%	*50%	*50%	*50%	*13%
Brinell (approx.)	92/112	103/143	103/153	103/179	105/149	121/179	140/202	179	179	418

* = Not less than. † = Not more than.

Colours in which steels should be painted before delivery.

Case Hardening Steels				"20" Carbon	"35" Carbon	3% Nickel	1½% Nickel Chrome	3% Nickel Chrome	NC Air Hard
"10" Carbon	"15" Carbon	2% Nickel	5% Nickel						
Yellow	Yellow and Dark Brown	Yellow and Red	Yellow and Violet	Light Brown	Dark Brown	Red	Light Blue	Violet	Green

manufacturer heat treats his own steel, he should specify it and be responsible for getting the results, and also for getting good stampings that do not spoil the steel.

In any event, if the purchaser discloses the results he requires, a responsibility naturally rests with the steel maker to demur if he considers the steel specified to be unsuitable for the purpose.

When the research on the physical properties of these steels is published, the appropriateness of any particular physical test will rest on a firmer foundation than it does at present.

In the meantime, it is only possible in a general way to use a hypothetical series of tests based on the characteristic variations of the physical qualities of steels.

The E.S.C. standards specify a scheme of colouring to facilitate the visual identity of steel. It is to be hoped that uniformity in this direction will come into vogue. Most firms have some system of colouring, and as none can be perfect, all might as well conform to the E.S.C. standards, so that the steel could be painted at the source.

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More "Overseas" Aeroplanes.

By way of celebrating Empire Day in a practical way, the Overseas Club presented six aeroplanes, costing £1,500 each, to the Royal Flying Corps. Each will bear the inscription "Overseas Club. Empire Day, 1916." This makes 68 aeroplanes which have been presented to the British Government through the medium of the Overseas Club, and His Majesty the King has congratulated the management of the Club upon the very successful work which has been achieved during the past eighteen months. Among the latest gifts may be noted :—

"Manya Krobo" (£1,500), presented by the chiefs and people of Eastern Krobo, Gold Coast.

"New Juaben" (£1,500), presented by the head chief, chiefs, and people of the New Juaben Settlement.

"Saran" (£1,500), presented by the residents of Saran, through the District Officer, F. M. Luce, Esq., I.C.S.

"Jamaica No. 2" (£2,250), presented by the people of Jamaica, through the Jamaica Aeroplane Fund Committee.

"John Macaulay" (native of Edinburgh), £1,500, presented by Mrs. H. P. Stromberg, in memory of her late father.

"Kwahu" (£1,500), presented by the Omanhene, chiefs and people of Kwahu, in the Gold Coast Colony, this being the eighth aeroplane to be presented by the private generosity of persons in this Colony.

Tunbridge Wells and Aviation.

At a public meeting held at the Great Hall, Tunbridge Wells, on the 3rd inst., under the chairmanship of the Mayor, the following resolution, proposed by Alderman Silcock, was unanimously adopted :—

"This public meeting of the citizens of Tunbridge Wells urges upon His Majesty's Ministers the vital need of more vigorous aircraft policy, and approves the creation of a Board of Aviation in consultation with the Navy and Army with that end in view."

Fatal Accidents.

At an inquest at Eton Wick, Bucks, on the 2nd inst., on the body of Lieutenant Alfred Boag, R.F.C., aged 32, who was killed while flying on April 29th, it was stated that the machine was struck by a sudden gust of wind about 100 feet from the ground and the pilot lost control. A verdict of "Accidental Death" was returned.

On May 8th an enquiry was held into the death of Corporal T. Gibing, R.F.C., who was killed on May 5th. He was a passenger on a machine piloted by Lieut. Browning, when the machine turned on its side and fell 150 ft. The pilot was seriously injured, and Corporal Gibing died soon after his admission to hospital. A verdict of "Accidental Death" was returned.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, May 2nd.

"As a result of combats in the air yesterday two hostile aeroplanes were driven down in a damaged condition and were seen to land a short distance behind the German lines."

General Headquarters, May 3rd.

"Yesterday our aircraft carried out a considerable amount of work in spite of the thundery weather. Few hostile aircraft were seen."

General Headquarters, May 5th.

"Yesterday, as a result of combats in the air, we drove down two enemy machines behind the German lines. One machine was wrecked, and the pilot of our aeroplane fired on the occupants after landing, and then returned safely to our lines. The other enemy machine was damaged. During the day one of our aeroplanes was lost, being brought down in the enemy's lines."

General Headquarters, May 6th.

"Yesterday a considerable amount of successful air work was carried out. The few hostile machines seen were driven off."

Admiralty, May 7th.

"With reference to the official German report published to-day, it is the fact that two of our naval aeroplanes are missing.

The body of Flight Sub-Lieutenant H. R. Simms, R.N., has been picked up at sea, and the Observer Sub-Lieutenant C. J. Mullens, R.N.V.R., is missing, his lifebelt having been picked up in the same vicinity.

"As regards the aeroplane reported captured by the Germans, the names of the officers concerned in this case are:

Flight Sub-Lieutenant Arthur T. N. Cowley, R.N.
Sub-Lieutenant Ronald M. Inge, R.N.V.R."

French.

Paris, May 2nd. Evening.

"A German aeroplane brought down by a French airmen yesterday fell in the enemy lines north of Douaumont."

Paris, May 4th. Afternoon.

"One of our machines fought two German machines in the region of Douaumont. One of the latter fell in a wrecked condition, while the other fled."

Paris, May 5th. Afternoon.

"One of our aeroplanes gave fight to two German machines in the region of Douaumont. One of them fell in a disabled condition; the other made its escape."

Paris, May 7th. Afternoon.

"In the course of the gale which raged the day before yesterday about a score of our captive balloons broke from their moorings. Several were carried into the German lines, while others came down within the French lines. The majority of the observers succeeded in landing in our lines by using their parachutes. News, however, is lacking of some who were carried into the enemy zone."

Paris, May 8th. Afternoon.

"Two German aviators were brought down in an air fight in the Verdun district. One of them fell in the vicinity of Ornes, and the other, which had been seriously hit, was compelled to come to earth south of Azennes."

Russian.

Petrograd, May 3rd.

"In the region north-west of Yarmolintze, south of Proskouroff, an enemy Albatros was compelled to descend owing to motor trouble, and we captured the aviators."

Petrograd, May 4th.

"South of the region of Dvinsk enemy aeroplanes dropped bombs on numerous points of this front.

"In the district south of the town of Krevo there was a violent artillery duel, in the course of which one of our shells blew up a German captive balloon which was correcting the German fire."

Petrograd, May 6th.

"Enemy aeroplanes dropped bombs on several parts of the front.

"In the region of Muravitsa one of our aeroplanes attacked two enemy machines, and after a fight of half an hour one German aeroplane came to earth in their lines; the other disappeared."

Petrograd, May 8th.

"Two German aeroplanes dropped eight bombs on the village of Liakhovitchi."

Italian.

Rome, May 3rd.

"Between the Adige and the Brenta an intense artillery duel took place. Enemy aeroplanes attempting to fly over the intervening mountainous region were repulsed by our airmen, who gave chase."

Rome, May 4th.

"The greatest aerial activity prevailed in the whole theatre of operations. Enemy aeroplanes dropped bombs on the Upper Val Camonica, the Ansiei Valley, the Lower Isonzo Plain, and on the towns of Ravenna and Cervia. A few persons were wounded and very slight damage was done.

"Two of our airships last night bombarded enemy entrenchments, batteries and camps in the vicinity of Rubbia, Merna and Biglia, in the Vippacco (Wippach) Valley, and the well-known aerodrome of Aisovizza, to the east of Gorizia. About two tons of explosives were dropped on the objectives with visibly very effective results. On the return journey one of our airships fell, from reasons still unknown, in enemy territory, in the vicinity of Gorizia. The other airship returned unharmed to our lines."

Rome, May 5th.

"An enemy aeroplane dropped four bombs on Limone (Lake Garda) without doing any damage to life or property. Attempts by enemy aeroplanes to raid our territory were repulsed by gunfire and by the prompt intervention of our chasing air squadrons."

German.

Berlin, May 2nd

"One of several enemy aeroplanes which dropped bombs on Ostend this morning, but which only succeeded in hitting the gardens of the Royal Castle, was shot down after an air battle near Middelkerke. Its occupant, a French officer, was killed.

"West of Lievin two enemy aeroplanes were shot down by anti-aircraft guns and machine-gun fire.

"Two French machines were put out of action in the neighbourhood of Vaux Fort."

"A naval airship yesterday successfully attacked the military installations in the Mohn Sound and at Pernau (north-east of the Gulf of Riga). The airship landed unhurt. At the same time our seaplanes dropped bombs on the military installations and aerodrome at Papenholm, in the island of Œsel (which lies athwart the gulf). The seaplanes returned undamaged and good effect was observed.

"A hostile air squadron yesterday attempted to attack our naval installations at Windau (Baltic coast of Courland, north of Libau), but it was compelled by our anti-aircraft guns to return without having achieved anything.

"According to a supplementary report, a French aeroplane was brought down in an air battle over Fort Chauane, west of Verdun, and another over the Thierville Wood, south-west of Verdun. Yesterday Lieutenant Boelcke shot down over the Pepper Ridge his fifteenth aeroplane, and Lieutenant Baron von Althaus, north of Fort St. Michel, his fifth aeroplane."

Berlin, May 3rd.

"Lieutenant Baron von Althaus shot down his sixth enemy aeroplane over Caillette Wood. A French aeroplane was brought down after aerial battle south of Thiaumont. Three others were brought down near Verdun by our guns."

Berlin, May 4th.

"In the Baltic the activity of our naval airmen is vigorous. A squadron of seaplanes again bombarded the Russian battleship 'Slava' and an enemy submarine in Moon Sound, scoring hits. An enemy air attack on our coast station of Pissen caused no military damage.

"One of our submarines on April 30th shot down a British aeroplane off the coast of Flanders. The occupants were rescued by an enemy destroyer."

The Press Bureau states that the exaggerations and misstatements in the above report are of the usual kind.

Berlin, May 5th.

"Aerial fighting developed in the course of April, especially in the second half of the month, to a great extent on the Western front, with increased bitterness.

"In place of single combats, fighting conducted in groups and squadrons is becoming more and more prominent. These battles are, for the greater part, fought to a finish on the other side of our lines.

"In the course of these battles on the Western front 26 enemy aeroplanes were brought down by our battle airmen during April, two of which came into our possession on our side of the front line of trenches. In addition to these, 10 aeroplanes succumbed to the fire of our anti-aircraft guns.

"Our own losses, on the other hand, amount altogether to 22 aeroplanes. Of these, 14 were lost through aerial battles, four through not returning, and four through being shot down from the earth.

"An English biplane, with a French distinguishing mark, fell into our hands, undamaged, on the coast, in the neighbourhood of the Dutch frontier. Its occupants saved themselves in neutral territory.

"A German squadron freely and successfully dropped bombs on the railway establishments in the Noblette and Auve Valley, in Champagne, as well as on the aerodrome at Suippe."

Berlin, May 6th.

"To the south of Warneton Sergeant Frankl brought down a fourth English biplane, and has thereby put his fourth enemy aeroplane out of action. His Majesty the Emperor has given expression to his appreciation of the achievements of the capable aviator by promoting him to rank of an officer.

"To the south-east of Diedenhofen a French machine was forced to land, and its occupants were taken prisoners. A great number of French captive balloons broke loose last night owing to a sudden storm and floated over our lines. More than 15 have been salved up to the present."

Berlin, May 7th.

"On Friday afternoon a hostile aeroplane was brought down in the course of an air fight off the coast of Flanders, one of our torpedo-boats assisting. The approach of British forces prevented the rescue of the occupants. One of our torpedo-boats yesterday captured a British aeroplane off the coast of Flanders undamaged, the occupants, both officers, being also captured."

Berlin, May 8th.

"Two French 'D' biplanes fell to the ground in a burning condition over Cote de Froide Terre."

Austrian. *Vienna, May 4th.*

"Last night an enemy airship crossed our lines at Wippach and dropped some bombs. It then proceeded in a northerly direction across the Idenia Valley, towards Laibach and Salloch. On its return our artillery fire cut it off near Dornburg, and the airship, which was simultaneously attacked by our aviators was set on fire and fell a wreck near the drill-ground at Gorizia. The four occupants were killed. Yesterday several of our aeroplanes attacked the Italian camp near Vilesse, and returned safely after dropping numerous bombs and taking part in a heavy aerial engagement.

"At 3 o'clock this afternoon a squadron of our seaplanes bombarded the railway station, a sulphur factory, and the barracks at Ravenna with good effect. Conflagrations were observed in the sulphur factory and at the railway station. Although heavily bombarded by two anti-aircraft batteries, all the aeroplanes returned.

"At the same time a reconnoitring torpedo-boat flotilla met four enemy destroyers to the south of the mouth of the River Po. A long-range artillery engagement ensued, but we were unable to score any success, as the superior speed of the enemy did not allow of our coming to close quarters. Several of our aeroplanes participated in the fighting and attacked the enemy vessels with machine-guns."

Vienna, May 5th.

"The day before yesterday our aviators dropped bombs on the railway junction of Zdolbunovo, south of Rovno. It is stated that the station, working shops, rolling stock and the railway lines were hit. Several buildings caught fire.

"On Thursday morning our seaplanes bombarded Valona and in the afternoon Brindisi. At Valona the batteries and the aerodrome were several times effectively hit. In Brindisi railway trains, the station warehouses, the arsenal and a group of destroyers lying close together were several times hit. Many bombs exploded in the town. An ascending hostile aeroplane was immediately chased. On the way back, far out to sea, the cruiser Marco Polo was observed with the crew standing close together on deck. The ship was fired at with machine guns. In spite of the heavy anti-aircraft fire, all our aeroplanes returned safely from Valona and Brindisi."

Turkish. *Constantinople, May 5th.*

"On the day of the capitulation of Kut el-Amara one of our aeroplanes, piloted by Captain Schütz, succeeded in shooting down in an air fight an enemy aeroplane, which was captured by us. The pilot was found dead, but the observer was captured. On the same day Captain Schütz brought down a second machine, the occupants of which fell into our hands wounded."

Constantinople, May 7th.

"One of the bombs dropped on May 3rd on Smyrna by two hostile aeroplanes hit a goods train. Three persons were slightly wounded. On the same day a hostile aeroplane flying over Diresserah was brought down north of that town. The pilot was captured. He had promised some approaching Bedouins money if they would facilitate his escape."

From Other Sources.

Mr. A. Beaumont, writing to the *Daily Telegraph* from Milan on May 2nd, says:—

"The impression left by the information from Switzerland is that Germany has thrown down her task before Verdun as hopeless. A certain amount of activity will continue to be shown opposite Verdun and also in the Vosges, where German aeroplanes fly in numerous squadrons, making daily demonstrations, but meanwhile there is a strong suspicion that a considerable amount of artillery is being removed from the Verdun front every night, and started on its way towards the Russian front. . . . .

"Meanwhile there are certain other indications also that Germany is conveying vast aviation material to the Russian front, which is always a premonition that she is preparing some big offensive."

The *Times* correspondent at Petrograd, wiring on May 3rd, says:—

"With the advent of warm weather German airmen have greatly developed their activity, chiefly on the northern front.

"Flights for reconnaissance purposes are usually undertaken by single machines, which, maintaining a great altitude, endeavour to cross the line of fire unperceived. More frequently, however, the objects of these raids are aggressive, when several aeroplanes participate, and in order to strike their target fly comparatively low, generally within range of artillery fire. Hitherto, despite the perfection of the enemy's machines, the material damage inflicted has been inconsiderable, and the moral effect *nil*.

"The latest German armoured aeroplanes are effective only against rifle fire, and powerless to cope with shells. Last week our artillery on the northern front brought down four machines, one of which was captured with the pilot.

"According to the latest estimates some 10 Zeppelins are now operating on this front, principally in reconnaissances which take them far afield. In spite of their strong armament they avoid encounters with our aeroplanes owing to the vulnerability of their envelope. Last week a Zeppelin was sighted near Uexküll making for Riga, whereupon two shrapnel shells were discharged, the second of which evidently damaged the enemy, who abruptly veered to the south-west and disappeared."

The *Daily Chronicle* correspondent in Paris, writing on May 2nd, gives the following details of the exploit of the French pilot who attacked a Zeppelin:—

"To the list of the intrepid aviators of France, famous for exceptional exploits, is now to be added the name of Sergeant Pilot Treille de Grandseigne, who has recently attacked in succession a German cruiser and a Zeppelin off the Belgian coast.

"The latter affair took place at about 2 o'clock last Wednesday morning, when De Grandseigne encountered in the North Sea, about 13 miles out from Zeebrugge, one of the German dirigibles returning from their raid on the Thames estuary.

"With a naval gunner he was piloting a French army machine of the type called avion-canon, or gun plane. They were at the great height of 12,000 ft. when the Zeppelin came in sight, and, careless of the fact that should it be injured and fall into the sea their machine had none of the floating power of a hydroplane, they at once attacked. Nineteen incendiary shells were fired, and, though no decisive success could be seen in the darkness, the dirigible is believed to have been several times hit and seriously damaged.

"Fuller details are now available of the other adventure which took place during the night of April 15th. De Grandseigne and his gunner had already distinguished themselves by night flights over the sea, in one of which they demolished a searchlight which was playing on them over Ostend.

"Leaving their camp at 9.15 on the night in question, and passing Nieuport and Middelkerke at a height of scarcely 1,500 ft., they were soon to the landward side of Ostend. Here De Grandseigne noticed that signals were passing between the harbour and two red lights at sea, which he divined to be German ships. This was the prey he had hoped for.

"Falling to only 300 ft. above the water, he approached, and found them to be two cruisers apparently making for Zeebrugge. The aeroplane was now under fire, but although several shells exploded near it, it was not touched. Meanwhile De Grandseigne's gunner had fired sixteen shells, repeatedly striking one of the cruisers, which must have been considerably damaged. Their ammunition exhausted, the aviators rose out of range and returned safely to their base.

"This is the first time a land machine has attacked a warship at sea, and there are only two or three cases of hydroplanes doing so.

"Sergeant Pilot Treille de Grandseigne, who is only 25 years old, and has done two years' military aviation service, after making several remarkable flights as a civilian, had already been decorated for several exploits."

Mr. G. Ward Price, writing to the *Daily Telegraph* from Salonica on Saturday night, said:—

"The twelve men of the Zeppelin crew, who were captured by the French as they came out of the shelter of the thick reeds of the marshes, consist of one lieutenant, three second lieutenants, and eight non commissioned officers, all Germans. They say that they are the whole crew of the airship, and as all are skilled ratings this

seems possible. I can find no confirmation of the statement that two charred bodies were found under the wreckage, and since the crew themselves set it afire they would naturally see all clear first. In their examination, they stated to the French headquarters that the Zeppelin came from Temesvar, in Hungary. This would be a very long journey, especially over so many mountain ranges, and till lately at least they had one at Sofia, much nearer. It would be natural that the crew should attempt to conceal their point of departure.

"Directly they got over Salonica, the searchlights that picked them up were of such unusual power, especially one of those of the Fleet, that they were dazzled, and unable to pick up their bearings. At the same time, shells began to burst all around them from all sides, and, according to their statement to the French, they were hit several times, one balloonet being burst and one of the four motors hit and stopped. It seems certain, however, that it was a shell from the anti-aircraft 12-pounder on the fore-bridge of a British battleship lying in the Gulf that actually brought her down. This shell was clearly seen to strike her, and from that moment she drifted gradually down on to the marshes, her fall taking over a quarter of an hour.

"The prisoners are lodged in a building that was formerly a German school at Salonica.

"Paying a second visit to-day to the wreck of the airship, I noticed written in pencil on the aluminium boss that forms the prow of the ship and links up all the girders of the frame, an address scrawled in pencil in German characters. It read: 'Potsdam,' then the name of a street and a number illegible, then the date 'August 13th, 1915.' This may possibly be the date when the airship framework was finished. It is at any rate an indication of the approximate period of her construction. Traces of the number on her side look like L. 55 or L. 85.

"One of the big petrol tanks was still burning this afternoon, thirty-six hours after the ship was set alight. The French have mounted guard over the ruins, and in spite of the fact that the water alongside the wreck is two feet deep, and that to get to it you have to wade much deeper still, a party of Canadian nurses were among the sightseers who struggled through the swamp to it this afternoon. Nothing has been done yet towards moving the wreckage, which would be very difficult over such a morass of tangled weeds and spongy mud. This desolate swamp may well be the grave of the sinister air monster, which we all watched shining yellow in the relentless glare of the searchlights yesterday morning. Its gaunt skeleton rears itself up 50 ft. above the marsh, and is a most conspicuous landmark for vessels entering the Gulf. All round the framework are semi-circular brackets, in which bombs were carried, and on them we found one still in position to-day.

"Comparing this wreck with that of the Zeppelin in which I happened to be making a trip six years ago, when she smashed up in Tentobergerwald, I was not struck by any difference as to size or arrangement such as would be apparent to the inexpert eye. This ship is, perhaps, longer than the Deutschland was. She seems to have been nearly 600 ft. in length. The size of the engine, gondolas, and propellers appears the same. The latter are of polished walnut wood, built in layers, and edged with copper. They are marked 'Lorenzen Propellor Partrax Original.' The German naval war pennant, which the ship carried, now decorates General Sarrail's room at the French Headquarters. The Agamemnon's ward room will have a much valued trophy in the form of one of her propellers."

The *Hestia* says that the destruction of the Zeppelin at Salonica is all the more satisfactory as it was the airship obtained by King Ferdinand as his personal guard.

An Exchange message from Copenhagen states that on Monday several German seaplanes passed northwards over Fanoe, and three Zeppelins were seen patrolling over the south of the island.

AIRSHIP ITEMS.

The Destruction of "L. 7."

THE following *communiqués* were issued by the Admiralty on May 5th:—

"12.30 *p.m.*

"A Zeppelin was destroyed yesterday by one of our light cruiser squadrons off the Schleswig coast."

"6.45 *p.m.*

"The Commander-in-Chief Grand Fleet has reported that the ships which destroyed the Zeppelin yesterday were H.M.S. 'Galatea,' Commodore E. S. Alexander Sinclair, M.V.O., A.D.C., and H.M.S. 'Phaeton,' Capt. J. E. Cameron, R.N., M.V.O.

"The Zeppelin was apparently employed on scouting duty when she was destroyed by the gunfire of these two vessels."

The following was issued by the Admiralty on May 6th:—

"A more detailed report has now been received of the destruction of Zeppelin 'L. 7.' It now appears that though severely damaged by H.M. ships 'Galatea' and 'Phaeton' her destruction was completed by a British submarine commanded by Lieut.-Commander F. Feilman, R.N., which rescued seven of the Zeppelin's crew, and has returned with them.

"She was attacked and slightly injured by a German cruiser on her return journey."

German Version.

"*Berlin, May 6th.*

"The airship 'L. 7' has not returned from a reconnoitring flight. According to an official statement by the British Admiralty, the airship was destroyed on Thursday in the North Sea by the British naval forces."

Zeppelin "Z. 85" Destroyed at Salonica.

The following was issued by the Admiralty on May 5th:—

"7.15 *p.m.*

"Vice-Admiral De Robeck reports that about 2.30 this morning a Zeppelin approached Salonica. When passing over the harbour she was heavily fired on and hit by the Fleet, and came down in a blaze near the mouth of the Vardar River. There were no survivors."

The following note was issued in Paris on May 5th:—

"During the night of May 4th-5th, about 2 in the morning, a Zeppelin which was flying over Salonica was brought down by the guns of the Allied Fleets.

"The Zeppelin fell in flames at the mouth of the Vardar."

The following was issued by the Admiralty on May 6th:—

"In a further report from Vice-Admiral De Robeck, concerning the Zeppelin brought down at Salonica, it is now stated that survivors of the crew have been found, and four officers and eight men have been made prisoners."

From official sources at Salonica the following information was obtained on Monday:—

"The vessel was 'No. Z. 85,' built at the latter end of 1915. She was 170 metres (560 ft.) long, and had four 100 h.p. engines. Her speed was 95 kilometres (60 miles) an hour. The tanks held 2,500 litres of petrol. She was recently engaged in bombing Riga, Minsk, and Dvinsk, and attempted at the end of February and in the middle of March to approach Salonica, but was driven off near the frontier.

"The Zeppelin was hit three times on Friday, once in a tank, once in a ballonet, and once near the stern."

German Version.

"*Berlin, May 6th.*

"One of our airships did not return from a trip to Salonica. According to British reports it was shot down and destroyed by fire."

The Wreck of the "L. 20."

ONE of the airships—the "L. 20"—returning from the raid on the north-east coast of England came to grief in Norway on May 3rd. The following account is given by the *Daily Mail* correspondent at Stavanger:—

"The Zeppelin 'L. 20,' wrecked on the shore of the Hafsfiord, four miles from Stavanger, at noon to-day, was first reported flying low at a slow rate across the Gannsfiord, between Dale and Hinna. The hull was then apparently still in proper order, but probably gas had been escaping. The weather was quiet and the sea calm. When above the Gannsfiord, the Zeppelin dropped an anchor and also six men, who are all reported to have been rescued and taken in charge by soldiers.

"The Zeppelin then drifted towards Hafsfiord, but, not having been sufficiently lightened, collided with a low-lying rock and turned a somersault sideways. She seemed to double up to something less than a right angle and slowly fell into the fiord. Then she drifted across the water to Jaasund, and she now lies ashore like a vessel hauled up on a slip for repairs."

According to the *Daily Mail* correspondent at Christiania:—

"Captain-Lieutenant Stabberf, the commander, stated that he left Germany at midday on Tuesday and journeyed to the coast of England. On Tuesday night he prepared to return, but very stormy weather forced him off his course many times. On Wednesday morning his petrol had nearly given out. Only about ten pints remained when he sighted the Norwegian coast and decided to descend."

The crew of sixteen men, four of whom are seriously injured, have been interned at Molde. As the wreck was being blown about dangerously by the wind the Norwegian military authorities exploded the remains on the following day.

FLIGHT

CORRESPONDENCE.

Wind Currents.

[1920] I thank Mr. Hearne for his courteous reply, and am glad to see him sound on the generally accepted belief *re* wind currents and airships, because I gathered a quite different view from his previous article. So much for that.

Now as to his special pleading *re* intermittent blasts or trains of air. I'll admit the irregularity of wind close to earth: this is especially so near big obstructions, such as hills, big buildings, cliffs, &c.; but as you get clear of this, or to the open sea, so does the wind become less irregular, and probably at great height the air is on the whole fairly homogeneous.

Still, I'll admit the irregularity even here, and what happens (leave the snow speculation and only consider the wind impact). If you meet this suggested train of air, the airship would almost instantly check its speed till it resumed its normal air travel pace, and so the effect would be merely momentary, because an airship has an early limiting speed and relatively small weight so inertia would not carry it far. Then, as Mr. Hearne suggests later, the contrary occurs, when you are shot out of a fast into a slower train of air; and this would be negative to the same degree as the other was positive, consequently if you are shuttled into and out of irregular trains of air the total effect would average practically to the condition of homogeneous air.

But this is getting rather near to dialectics which does not interest me.

Otherwise I find Mr. Hearne's remarks quite interesting, and there is plenty to dilate upon, such as the feasibility of zones of inflammable gases round a Zepp lin, the difficulties of housing and getting them out of their sheds in wind, and other details seldom appearing in print.

CHAS. S. DYER.

Engineers and the Air Services.

[1921] 1. The present agitation for a better air service misses one of the most vital points of possible improvement.

2. Most of the talk centres around the co-operation of naval and military administration, which is inevitably difficult, if not impossible, to arrange on the lines suggested.

3. The Air Services, as fighting units, are at present essentially adjuncts of the Navy and the Army, and must so remain to the end of the present war at least.

4. In the future, possibly, the Air Service may become an independent unit, but we are concerned most just now with the immediate improvement of things as they exist.

5. What is, however, essentially common to both branches of the Air Service is their engineering aspect, and it is in this direction that co-ordination of effort can most usefully be tried and might more profitably be insisted upon.

6. It has frequently and truthfully been stated that this war is an engineers' war, and it is all the more remarkable, therefore, that so little endeavour has heen made systematically to organise the engineering *personnel*.

7. At the present time we are still without a Corps of Mechanical Engineers.

8. The Royal Engineers is a Corps mainly concerned with engineering in the field, while the engineering branch of the Navy is mainly concerned with work on board ship.

9. We have no properly constituted branch of either Service concerned with engineering in the factory.

10. Until the formation of the Ministry of Munitions, there was not even a department of the Government for co-ordinating contracts and accelerating output.

11. The Ministry of Munitions is essentially a civil department of the State, as at present constituted. An engineer cannot enlist into the Ministry of Munitions.

12. If there were a Corps of Mechanical Engineers into which every qualified engineer and mechanic could now enlist, it would afford the means of more rapidly developing the various organisations that need such men at the present time.

13. Incidentally it would, I think, greatly facilitate both branches of the Air Service in the production and inspection of the high-class engineering work they require.

14. The inadequacy under which the Air Services labour is not one of administration, but of material.

15. The administrative requirements are fundamentally different for the two branches of the Service, but the nature of the material is fundamentally the same, and I firmly believe that much might be done to accelerate production by co ordinating the engineering aspects of the situation.

16. The proposal that I make for the formation of a Corps of Mechanical Engineers goes far beyond the immediate question of the Air Services, inasmuch as such a corps would form the nucleus of a general co-ordination of engineering effort on the technical side.

17. Primarily, the function of the Directorate of the Corps would be to classify the country's available engineering *personnel*. It would keep track of the whereabouts of every qualified engineer and mechanic, and would supply drafts of such men wherever their services might most urgently be required.

18. For example, suppose the Aeronautical Inspection Department of the War Office required more Examiners and Inspectors; men from tbe Corps of Mechanical Engineers would be attached to the Inspection Department for that special duty.

19. Similarly, if the Royal Flying Corps or Mechanical Transport, for example, required engineers to undertake the maintenance of material in the field, they would obtain them from the Corps of Mechanical Engineers, and if at a later period they could be released from service, they would revert back to the Corps of Mechanical Engineers with that much additional experience to their credit.

20. While the duty of the Directorate of the Corps of Mechanical Engineers would be mainly to assist existing organisations to work efficiently, it would also endeavour, as far as possible, to arrange for uniformity of method, where such uniformity would facilitate progress.

21. For example, there is nothing that so influences production as the question of detail inspection, and there is a marked difference in this work as at present carried out under the War Office and the Admiralty administrations.

22. It would be the duty of the Corps of Mechanical Engineers to unify the technical procedure, so that a manufacturer building a certain engine, for example, for both the Admiralty and the War Office, would not build it under entirely different conditions, as is in fact the case to-day.

23. In doing this, an endeavour might also be made to broaden the basis of inspection by regulating it more closely by the evidence of actual performance.

24. One of the chief criticisms levelled against detail inspection is that it makes insufficient allowance for practical requirements.

25. This defect would be cured if instructions to Inspectors of Workmanship were prepared by Inspectors of Performance specifically told off to observe the actual behaviour of machines in service.

26. Inspectors of Performance would spend their time partly with the Army in the field and partly in the works, and each piece of mechanism would be under the special observation of a group of men who would work in co-operation and would become experts in their particular subject.

27. They would keep the engineers in the factory advised of the difficulties experienced in the field, and at the same time would keep the engineers in the field advised of the special defects experienced at home.

28. In this way there would be established a link between the man at the Front and the man at home, such as does not at present exist, but which would, I feel sure, exercise a material benefit on all concerned.

29. There would be no difficulty on the score of militarising engineering labour, because the works organisations could continue as at present, on a civil basis, by transferring all men so engaged to the reserve. This is, in fact, the condition of those engineers who have attested, but who are still engaged in civil employment.

30. The essential point gained by the creation of the Corps of Mechanical Engineers would be that all qualified men now being released by engineering factories would pass straight into the Corps of Mechanical Engineers and would be drafted thence wherever their services were most required—if necessary into Infantry and Artillery regiments. The point is that the Corps of Mechanical Engineers would always know their whereabouts and would have the authority to get them back again if their particular skill was more urgently required elsewhere.

31. Similarly, in the case of all the engineers now in the Army outside those in the Royal Engineers, arrangements would be made to obtain their names in case their service might be required; but obviously no dislocation of existing conditions would be permitted unless the urgency of the case warranted it.

32. At the present time no organisation dealing with the country's engineering *personnel* exists, and since the beginning of the war our strength in this direction has been frittered away by the release of men from factories direct into the Army, without any attempt to keep track of them.

33. The Ministry of Munitions has, of course, taken the question of the supply of engineering labour in hand to some extent, but the Ministry of Munitions does not deal with all the grades that would

properly belong to the Corps of Mechanical Engineers, nor does it retain the same permanent hold over the individual. The Ministry of Munitions either retains the man in civil employment or releases him. If he is released, his identity as a potential unit of our engineering strength becomes speedily submerged, whereas if he belonged to the Corps of Mechanical Engineers he would be retained permanently and the Army would not suffer, because the Corps of Mechanical Engineers would be responsible for supplying the Army as well as for supplying the factories under civil control.

34. All branches of engineering, other than those already undertaken by the Royal Engineers and the engineering branch of the Navy, would come under the Corps of Mechanical Engineers.

35. It is apparent that the Corps of Mechanical Engineers would be of military status, but since it would be concerned equally with the Army and the Navy, it could not properly be placed under the administration of either the War Office or the Admiralty. The obvious procedure would be to place it under the direction of the Ministry of Munitions, which would then control all aspects of this side of war and would provide the much needed connecting link between the two fighting services.

36. In addition to the above-described work, the Directorate of the Corps of Mechanical Engineers would also be responsible for the collection of technical data, standardisation, and the co-ordination of progressive design.

37. The whole of the undertaking sounds monstrously large, no doubt, but it must be remembered that much useful work has already been done, and many organisations and engineering institutions already exist whose co-operation would render the accomplishment of the broader scheme eminently practicable.

38. The Ministry of Munitions and the Directorate of the Corps of Mechanical Engineers would constitute a central technical authority of national importance to which all the older institutions would not hesitate to render assistance at the present time. And, so long as the policy is to unite and co-ordinate the best of what already exists, the issue is assured of success.

A. E. BERRIMAN, Chief Engineer, Daimler Co.

Birds and the Wind.

[1922] In "FLIGHT" for April 27th Mr. R. P. Hearne suggests that he has an idea that birds can see the wind. This is of interest to me, as, though I am no ornithologist and but an amateur in flight, I have for some time been in the habit of observing birds in flight as closely as I possibly could. I agree with Mr. Hearne that birds show an uncanny prescience in the matter of anticipating gusts, &c., &c., but I beg to make the following alternative suggestions as to the cause of this.

Birds have remarkable eyesight, it is true, as is evinced by their food hunting. They sight their prey, be it insects, grubs, seeds, or, in the case of sea birds, fish, from long distances, but this very fact to my mind leads to the conclusion that they cannot see the wind. There is a certain optical law which, crudely put, amounts to this, that one cannot see an object clearly and see through it clearly at the same time. Water, window panes, or fog, particularly the latter, are examples of what I mean. "Optical Density" is, I believe, the technical term for this phenomenon.

As an eagle sights a rabbit from many hundreds of feet up, it is hardly likely to see the air between, which, if visible, would presumably resemble a thin mist or haze, or alternatively if it could see the air clearly, as a fog, say, it would hardly be likely to see the ground from great altitudes.

Therefore I suggest as an alternative that they can hear the air, and I adduce the following reasons. Birds have very sharp hearing. I have observed this personally in several ways, and I have heard that on the day of the Battle of the Dogger Bank, pheasants, &c., were disturbed in a curious manner in this locality, similar in kind to their alarm at local sounds or in the shooting season. Man can hear a sea fight from 40 miles away, but these birds seem to have heard it from 150 miles or so away, if the above explanation is the true one, as appears to me most likely. Animals, such as dogs, generally have much better hearing than men, so why not birds likewise?—in fact, to be logical, birds which are wild should hear better than dogs, which are partially civilised, and, accordingly, partially robbed of their natural functions (as compared with their prototype the wolf-dog).

Man can hear the wind most clearly, and can tell its direction largely by hearing, when there are obstacles in the path which it follows, such as trees or a house corner.

Now, if man with his relatively poor hearing can hear the wind when it passes an obstacle—the sound being caused by friction—why should not a bird hear sounds beyond the human scale, caused by the friction of two bodies of air moving at different speeds, and maybe in different directions, and be able to judge of them accordingly?

Furthermore the rule of "Optical Densities" does not apply to sounds. One can hear two totally different sounds, such as the wind and a person speaking, at the same instant. Therefore I think a bird can hear the wind and other sounds simultaneously.

I trust your correspondent will not take these remarks in a disparaging manner, but will treat them as ideas of one who, like himself, is interested in the welfare of all, man, bird, beast, or fish, which takes its way through the air. Further, if he can find flaws (which I doubt not is easily possible) in my argument, will he point them out? Perhaps too, a little of both—a happy medium is the right thing here as so often elsewhere. Birds may be able to partly see and partly hear the wind gusts. After all, all our senses work in conjunction.

WALTER E. ASTON.

Rusholme, Manchester.

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FLYING AT BOURNEMOUTH.

A GOOD SIZED crowd visited the aerodrome on Wednesday of last week, when they witnessed some very interesting stunk flying by S. Summerfield on the L. and P. biplanes. On one occasion he attained a height of over 3,000 ft. above the surrounding country. From this height he shut off his engine and spiralled down to earth, landing on the same spot from which he started. Mr. Summerfield also took up several passengers on the 60 h.p. 'bus, reaching heights of nearly 2,000 ft., and treated them to steeply-banked turns and steep dives. Unfortunately a strong wind prevented any flying from taking place last Saturday, but several visitors inspected the machines, &c.

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A "Brush" Presentation.

THERE was an enthusiastic gathering in the aviation department of Brush Electrical Engineering Co., at Loughborough, on the 20th ult., when the employees presented the Manager of the department, Mr. O. L. Mellersh, with a silver rose-bowl, in anticipation of his marriage, which took place on April 25th. In handing the gift to Mr. Mellersh in the name of his fellow-workmen, Mr. A. C. Self emphasised the esteem in which Mr. Mellersh was held, and said that his enthusiasm inspired one and all. In thanking the workpeople for their gift, Mr. Mellersh paid a tribute to the loyal manner in which all had stood by him, and stated that he had independent testimony that the work turned out was second to none in the country. His relations with the workers had always been of the most cordial character, and he numbered among them his most intimate friends.

Napier's and the Star and Garter Scheme.

THE Napier entourage is ever ready to lend a helping hand to any worthy object, and the staff of the Company are organising a concert in aid of the Star and Garter Fund for totally disabled soldiers and sailors, which is under the patronage of H.M. the Queen and Queen Alexandra. Many well-known theatrical and concert artists have promised their support, and the fund should benefit considerably, as it will receive the whole proceeds, all expenses being borne by the Napier staff. The concert will be held on Friday, May 19th, in the large Concert Hall adjoining Hammersmith Baths, Lime Grove, W., and tickets can be obtained from Mr. A. J. Slinn, 14, New Burlington Street, W.

An Integral Change.

NOTE should be made by those interested that the address of the Integral Propeller Co., Ltd., is now Edgware Road, The Hyde, Hendon, N.W. The telephone call has been changed to Kingsbury 104.

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